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Does a Community Based Heart Failure Disease Management Programme Improve Quality of Life, Knowledge and Self-Care Behaviour of Participants? A Service Evaluation.

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Abstract.

Background: Heart failure also has poor clinical outcomes with around 40% of people dying within one year of initial diagnosis. Heart failure patients have a five-year survival rate of just 58% compared to 93% in the age- and gender-matched general population. It has long been identified that education and improving self-care behaviour is an important aspect of managing heart failure to aid in reducing costs to the economy as well as, more importantly for patients, improving quality of life. The aim of this service evaluation is to assess the impact of the Living Well with Heart Failure Programme on participants in terms of knowledge, quality of life and self-care behaviour.
Method: 21 participants (14 males, 67 yrs ±13, 7 females, 72 yrs ± 9) with diagnosed heart failure took part in a pilot six week disease management programme consisting of education, social interaction and relaxation practice facilitated by a community cardiac rehabilitation practitioner. Participants' quality of life was assessed via the Minnesota Living with Heart Failure questionnaire and self-care behaviour was measured via the Self-Care of Heart Failure Index at week one and week six along with a knowledge questionnaire. Paired t tests were conducted on the overall sample with further analysis being carried out on genders, NYHA classifications and age groups both within and between groups.
Results: There was a significant improvement in quality of life of 12% (p=0.005) and participant knowledge improved by 100% (p=0.005). Self-care behaviour also significantly improved - maintenance 70% (p=0.005), management 66% (p=0.005) and confidence 63% (p=0.005). Whilst all groups showed significant improvements in quality of life, knowledge and self-care behaviour, no significant differences were found between them.
Conclusions: Statistically significant improvements in quality of life, knowledge and self-care behaviour were seen in the participants of the Living Well Programme. The design of this programme of not only educating participants but also encouraging self-care behaviours with continued support and motivation would seem to be key in promoting behaviour change which in turn improve well being. On the basis of the evidence provided in this service evaluation local primary care trust should look to commission the Living Well Programme across East Lancashire allowing all heart failure patients in the area the opportunity to empower themselves to improve their health and well being.

Key Words: Heart Failure, Disease Management Programme, Quality of Life, Self-Care Behaviour

Table of Contents.

List of Figures.

List of Tables.

List of Abbreviations.

BBC	Burnley Borough Council
BHF	British Heart Foundation
CI	Confidence Interval
CRP	Cardiac Rehabilitation Practitioner
DH	Department of Health
ECHOES	Echocardiographic Heart of England Screening Study
ELHFSNS	East Lancashire Heart Failure Specialist Nursing Service
ELHT	East Lancashire Hospitals Trust
ELPCT	East Lancashire Primary Care Trust
DMP	Disease Management Programme
HFSN	Heart Failure Specialist Nurse
LWP	Living Well Programme
MLHFQ	Minnesota Living with Heart Failure Questionnaire
NHS	National Health Service
NICE	National Institute of Clinical Excellence
NYHA	New York Heart Association
PKQ	Patient Knowledge Questionnaire
SCHFI	Self-Care of Heart Failure Index
UK	United Kingdom

Chapter 1.

1.1: Study Background.

Heart Failure is a complex clinical syndrome of signs and symptoms, which together suggest the pumping capacity of the heart is impaired. The most common cause of heart failure in the United Kingdom (UK) is coronary artery disease with many patients having had a myocardial infarction previous to their heart failure diagnosis (Peterson, Rayner & Wolstenholme, 2002).

Heart failure affects approximately 3% of the UK population (Davies et al., 2001) and is increasing in prevalence and incidence affecting more than 900,000 people with more than 63,000 new cases being reported each year. The median age for presentation with heart failure is 76, with males presenting at a median age of 73 and females at 78 (Cowie et al., 1999) and 60% of those diagnosed with heart failure are male (Peterson et al., 2002).

Heart failure impacts not only on the individual and their family but also on health care provision and the wider economy and is one of the most common reasons for emergency medical admissions, accounting for approximately 5% of all admissions and costing £625 million in inpatient care alone. As heart failure prevalence increases with improved survival rates (Mehta et al., 2009) due to more effective treatments of conditions such as myocardial infarction and hypertension so too will this economic burden continue to increase.

Readmission rates are as high as 50% in the first six months following the initial hospital stay and hospital bed days occupancy which, at an average of thirteen days, is three times longer than the average stay representing 2% of all inpatient stays in England (Peterson et al., 2002).

Heart failure also has poor clinical outcomes with Cowie et al. (2000) showing that around 40% of people die within one year of initial diagnosis. According to the

Echocardiographic Heart of England Screening Study (ECHOES) (Hobbs, Roalfe, Davis, Davies & Hare, 2007) heart failure patients have a five-year survival rate of just 58% compared to 93% in the age- and gender-matched general population. The Department of Health document National Service Framework for Coronary Heart Disease (2000a) suggests that this poor prognosis may be attributed to uncontrolled symptoms through non-adherence to recommended medication and lifestyle changes.

It has long been identified that education and improving self-care behaviour (Jaarsma et al, 2000, Krumholz et al., 2002) is an important aspect of managing heart failure to aid in reducing costs to the economy as well as, more importantly for patients, improving quality of life and is now an integral part of the National Institute of Clinical Excellence's guidelines for managing chronic heart failure (National Institute of Health and Clinical Excellence (NICE), 2010).

1.2: Study Demography.

Provision for education in East Lancashire around management of heart failure centres around one to one support from the East Lancashire Heart Failure Specialist Nursing Service (ELHFSN), which began with one nurse in 2006 and now consists of a team of four heart failure specialist nurses (HFSN) and one palliative care nurse. The priority remit of the ELHFSNS is to stabilise patients referred from both the acute setting and primary care through appropriate medicine management and then discharge them back into the care of the General Practitioner. The education element of the intervention is provided on a one to one basis on the ward, if admitted to hospital, a home visit post discharge and community clinics or further home visits for the housebound. As the diagnosis of heart failure in East Lancashire continues to improve with the recruitment of a Consultant Cardiologist with a specialist interest in heart failure the team will be under increased pressure in the provision of this labour intensive approach to self-care. The

ELHFSNS currently hold a caseload of around 800 patients and, as the specialists in their field, are in the best position to provide the education to their patients.

Chapter Six of the National Service Framework for Coronary Heart Disease (DOH, 2000a) suggests readmission rates for heart failure being as high as 48% over a three month period and more recently the 2003 Euro Heart Failure Survey (Cleland et al.) which included 24 countries found that the readmission rate is 24%. Information received from Angela Graves, service manager for the ELHFSNS indicates that the readmission rate for the patients on the caseload of the ELHFSNS is at 9% (Personal communication, July, 20th, 2011). Whilst there is most certainly a huge improvement in the care of people with heart failure in East Lancashire it was also recognised that there are still gaps in provision for these patients.

With the launch of the new East Lancashire Cardiovascular Health Improvement Service in October 2011, it will allow the opportunity for development of all cardiovascular health improvement initiatives, including heart failure rehabilitation, along with greater partnership working between the cardiac rehabilitation multidisciplinary teams in East Lancashire and across the organisational boundaries, offering the long awaited 'green light' for change.

As part of this new service patients with identified heart failure will be able to access the traditional community cardiac rehabilitation exercise classes but have been identified as requiring specific education and group support to help improve participants' self-care behaviour as indicated in the Heart Failure Commissioning Guide (NHS Improvement 2008). In consultation with the clinical lead of the ELSHFNS, Burnley Borough Council's (BBC) Cardiac Rehabilitation Practitioner (CRP) designed the holistic pilot programme looking to address participants' educational and emotional issues through specific condition management education and a programme of stress management and relaxation and, crucially, did not exclude any participant who is unable

to take part in an exercise-based rehabilitation programme due to the stability of their condition.

1.3: Aims and Objectives.

The primary aim of this service evaluation is to evaluate the data collected from the pilot 'Living Well with Heart Failure' self-care programme (LWP) participants and to assess its impact in terms of knowledge, quality of life and self-care behaviour.

A further aim of the evaluation of data is to assess the differences, if any, between the genders, New York Heart Association (NYHA) heart failure classifications and identified age groups taking part in the pilot LWP in knowledge, quality of life and self-care behaviour.

The results gained from the analysis of this data will provide East Lancashire Primary Care trust (ELPCT) with evidence as to the effectiveness of the LWP and this will determine whether the community based LWP can be rolled out to all boroughs across the East Lancashire footprint. It is hoped that the LWP will be commissioned by ELPCT and ultimately General Practitioner Consortia thus allowing more heart failure patients the opportunity to access a quality evidence based programme which will bring about an improvement in quality of life for them.

Limitations to the service evaluation include the relatively low number of participants able to access the first programme and the lack of a control group. The LWP was initially designed as a pilot programme to assess its effectiveness before being rolled out across ELPCT.

Chapter 2. Literature Review.

2.1: Introduction.

A literature search, between the inclusive periods of January 1990 to August 2011, was carried out to establish the evidence relating to specific community based disease management programmes (DMP) for patients with heart failure whose primary or secondary outcomes were around knowledge, quality of life and self-care behaviour of the participants. A search was then carried out into heart failure specific DMPs, which have relaxation as a component of the programme. In order to assimilate the evidence for differences in quality of life, self-care behaviour and knowledge between genders, NYHA classification and age a further search was also conducted. Searches were carried out in non-electronic sources in the University of Chester library and in online sources within the online catalogues of;

- 'PubMed' (http://www.ncbi.nlm.nih.gov/pubmed)
- 'Cochrane Reviews' (http://www.cochrane.org/cochrane-reviews)
- 'Science Direct' (http://www.sciencedirect.com)
- Wiley Online Library (http://onlinelibrary.wiley.com)

Databases were searched with the keywords 'heart failure', 'disease management programme', 'knowledge', 'self-care behaviour' and 'quality of life', which generated a large amount of literature. The search was further refined with the keywords 'relaxation therapy' and also 'gender', 'NYHA' and 'age'.

First of all, an understanding as to the various types of interventions available for improving knowledge and self-care behaviour in heart failure patients was required to be able to assess the effectiveness of the LWP for the purposes of this service evaluation.

Four formats of intervention were identified, researched and discussed below these being: Pre discharge education interventions, post discharge one-to-one education interventions, group based DMPs and groups including relaxation therapy. Secondly an understanding of the effects of interventions on the quality of life, self-care behaviour and knowledge of the individuals taking part and the categories those individuals are broken down into: gender, NYHA classification and age, would determine whether any differences exist between the groups identified.

2.2: Pre Discharge Education Interventions.

Much of the evidence for patient education and condition management programmes for heart failure patients are hospital-based interventions carried out by a heart failure nurse after a hospital admission for heart failure and before the patient is discharged. The patient is then routinely followed up with a home visit or in an outpatient clinic (Atienza et al., 2004, Cline, Israelsson, Willenheimer, Broms & Erhardt, 1998, Del Sincado et al., 2007, Jaarsma et al., 1999, Jaarsma et al., 2000, Koelling, Johnson, Cody & Aaronson, 2005). These studies also focussed mainly on NYHA class III and IV patients as, by nature of the fact that were admitted due to heart failure symptoms, they will be more likely to have an unstable or worse condition than those in the care of their General Practitioner. Outcomes for the studies were usually related to reducing hospital readmission or cost effectiveness with secondary outcomes being around quality of life or improvement in self-care behaviour.

The pre discharge education method tends to consist of one-to-one verbal education session usually by a nurse and sometimes supplemented with written information in a more intensive manner. In a survey of information recall amongst over 3000 heart failure patients (Lainscak et al., 2007) it was seen that 12 weeks after receiving the advice in this format patients could recall only 46% of the advice given to them and

this recall was in the main relating to diet and exercise. Dale's Cone of Experience (1969) teaching theory suggests that the amount of information retained from such an intervention even if supplemented by written information is around 20%. This theory suggests that by introducing more visual learning and experience based learning e.g. learning how to weigh themselves and record it correctly, improved information retention can be achieved. A DMP, which usually lasts for several weeks, is able to incorporate a range of teaching methods including the visual, audio and kinaesthetic techniques to suit all learners and enhance information retention.

The success of the previously mentioned studies varied in terms of quality of life and self-care behaviour outcomes. An early study by Cline et al. (1998) found that after two 30 minutes hospital sessions and a home visit, quality of life did not significantly improve however in a 1999 study by Jaarsma et al. which involved in a pre discharge education session and a home visit one week post discharge improved self-care behaviour at both the one month and eight month follow ups and this was backed up by a further study by Jaarsma et al. in 2000 in which patients had four in-patient education sessions followed by a home visit and one telephone call. This time however self-care behaviour had improved in the intervention group at one month and three months but not at nine months which may suggest that it is not the amount of education received that is key but it is the quality that is of most importance along with the possibility of ongoing support sessions at regular intervals.

In a later study by Atienza et al. (2004) a follow up at one year by the Minnesota Living with Heart Failure Questionnaire (MLHFQ) revealed that quality of life had significantly improved for the intervention group who had only received a pre discharge education session, a General Practitioner home visit and follow appointments in a heart failure clinic. Conversely a 2005 randomised controlled trial by Koelling et al. showed again by MLHFQ that even though quality of life had improved significantly at 30 days,

at 180 days there was no significant difference between the control and intervention group. The intervention in this randomised controlled trial was purely a one-hour education session pre discharge with follow up telephone calls to collect baseline information only and this may have reflected in the non-significant difference seen at five months compared to Atienza et al. (2004) study's difference in quality of life at 12 months. A little more recently in a study by Del Sincado et al. (2007) which mirrored the study by Atienza et al. (2004) in terms of intervention by pre discharge education, a General Practitioner home visit and clinic visits, long term follow up at two years found that quality of life had significantly improved for those from the intervention arm of the study. There may be some argument that involvement of primary and secondary care in long term care can help to improve quality of life for patients however by the time of the follow up date many of the more poorly patients may have died and therefore the results of those who would be more likely to report worse outcomes will not adversely affect the result.

A 2010 systematic review (Ditewig, Blok, Havers & van Veenendaal) noted that whilst the programmes they reviewed showed that there are benefits from educational interventions it is not always clear which element of the intervention was responsible for those beneficial effects and as interventions vary so widely again it is impossible to pinpoint which is style is most effective. An issue highlighted when collating the quality of life data was that even though there is a large amount of data available on quality of life it was assessed using different methods thus making it difficult to compare like with like data and therefore becoming an unreliable evidence base. Further limitations with the studies reviewed were that the samples are relatively small and the follow up periods are also relatively short indicating a need for longer well-designed studies with larger sample sizes to enable more robust results.

2.3: Post Discharge One-to-One Education Interventions.

A different model for disease management in heart failure patients is post discharge education by specialist nurses either at home or in clinic. Herschberger et al.'s (2001) evaluation of a disease management intervention showed a significant improvement in quality of life and knowledge particularly with regards to the importance of daily weighing, but also an improvement in the perceived importance of sodium restriction in the diet. The intervention consisted of clinic visits with nurses who educated patients in self-care strategies and would then provide intense follow them up via telephone calls and even pre emptive hospitalisation for decompensating patients. This was a United States intervention where most patients have medical insurance to pay hospitals for the elective hospitalisation unlike the UK where the burden for cost lies with the state. The programme also had intensive back up by cardiologists and a social worker as well as the specialist nurses. As the study was an evaluation with no control group it is not possible to assess whether the improvements in quality of life and knowledge may have happened as a result of usual care.

In Stromberg, Martensson, Fridlund, Levin, Karlsson, and Dahlstrom's (2003a) randomised controlled trial of a nurse-led clinic intervention self-care behaviour was a chosen outcome alongside mortality and morbidity. 106 patients took part in the trial with most being NYHA class III. Patients were encouraged to have as much contact as they required with the nurses however the majority (28) had just one visit. Self-care behaviour improved at three months and this improvement was still seen at 12 months. It is possible however, that the numbers of patients dying before the 12-month follow up may have affected the 12-month outcomes. It is also worth noting that those in the control arm of the study had almost three times higher mortality than those in the intervention arm suggesting there may have been some benefit from the support given by

specialist nurses or it may be a reflection on the poor care from the primary care physicians.

DeWalt et al. (2006) also enrolled patients from primary care into a clinic education session this time led by a pharmacist or a health educator and patients were then supported via telephone contact over the following six months. One of the primary outcomes, quality of life, was measured via the MLHFQ, which had been modified to a four point likert scale and found no significant improvement in quality of life at the 12 month follow up. There was however a significant improvement in secondary outcomes of self-care behaviour and knowledge. It is possible that using an adjusted version of the MLHFQ may have affected the validity of the tool and therefore the results obtained may not be accurate.

In a review by Coulter and Ellins (2006) information only education appears to have only a limited effect on patient self-care with improvements on outcomes other than improved knowledge not being found. Simply providing a patient with information does not guarantee that they will gain knowledge and it has been seen that this increase in knowledge does not necessarily lead to an increase in self-care behaviour (Ditewig et al., 2010). Indeed impaired cognition, which is common in patients with heart failure, (Vogels, Scheltens, Schroeder-Tanka & Weinstein, 2007) may affect the ability to retain this information and therefore be able to implement any changes required and then maintain those changes for optimum self-care (Dickson, Deatrick, Goldberg & Riegel, 2006). Therefore it appears from this evidence that the old adage 'you can lead a horse to water but you cannot make it drink' has never been more appropriate than when attempting to improve self-care behaviour. However teaching practical self-care skills along with the psychological and social aspects associated with self-care programmes are believed to be important in increasing adherence to self-care behaviour.

2.4: Group Based Disease Management Programmes.

Government policy emphasises the need for self-care in the modern patient-centred approach to healthcare (Department of Health (DH), 2005). Shared responsibility for care between patient and health care practitioner has been established health care policy since 2000 when self-care was first recognised (DH, 2000b). Since then there have been a series of documents, which have driven the self-care agenda (DH, 2001, DH 2005 & DH 2006) with an overarching agenda of reducing the cost to the National Health Service (NHS). A later government publication (DH, 2008) has also looked to try to bring the acute services out into the community, and in some cases, into patient's homes to enable and encourage ease of access and an increased uptake in those who are generally less likely to access continued care. Central to all the policy documents is the belief that patient empowerment through education, support and the provision of self-care strategies can improve their symptom control and quality of life and in doing so reduces the burden to the NHS.

The terms self-care and self-management appear to be interchangeable amongst the literature. Self-management has been applied to education programmes such as the Expert Patient Programme (DH 2001) and can be described as a component of self-care. Barlow, Wright, Sheasby, Turner & Hainsworth (2002) described self-management as:

> The individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and life style changes inherent in living with a chronic condition. Efficacious self-management encompasses ability to monitor one's condition and to effect the cognitive, behavioural and emotional responses necessary to maintain a satisfactory quality of life. Thus, a dynamic and continuous process of self-regulation is established. (Barlow et al., 2002).

and refers to a patient's ability to adhere to behaviour changes which will benefit their condition whereas self-care in long-term conditions has been described as "The activities that enable people to deal with the impact of a long term condition on their daily lives, dealing with emotional changes, adherence to treatment regimes and maintaining those things that are important to them – work, socialising and family" (DH, 2006) which pertains to the activities performed in order to self-manage.

While there are many barriers to self-care for heart failure patients (Riegel & Carlson, 2002) there are also ways to facilitate this behaviour and chronic disease self-management programmes are widely used across the world for many long-term conditions (Kendal et al., 2007, Kennedy et al, 2007).

The chronic disease self-management programme is a generic cognitive-behavioural group programme underpinned by the assumption that patients with different chronic diseases can learn from each other as they face similar adaptive tasks (Lorig et al., 1999). Many of these programmes are based on Albert Bandura's (1997) self-efficacy theory where goal setting, improving knowledge, motivation and peer support assists to increase self-efficacy, which is a powerful determinant of behaviour change. This positive behaviour change will then impact on important areas of condition management to improve quality of life and in the interests of the health economy, ultimately reduce hospital readmissions. Many chronic disease self-management programmes are primary care or community based and make use of lay people to deliver such programmes as an 'expert patient' (DH, 2001).

Heart failure patients, it seems, would appear to benefit from this programme structure as they face many long-term challenges in physical functioning, adhering to a strict dietary and medication regime and dealing with anxiety and stress. The programmes may not only address the medical management of the condition, but also improve social and emotional self-management abilities in turn may positively influence

self-care behaviour and quality of life. Skill development in reading food labels, learning how to monitor weight and altering diuretic medication as required may seem relatively straightforward but are crucial in good self-care and most patients require support in mastering these skills and these programmes provide that skill development and mastery. However the effects of these types of programmes having specific reference to heart failure have not been as widely assessed.

In a recent randomised controlled trial of a heart failure specific DMP Smeulders et al. (2010) assessed the impact of a six-week programme facilitated by a nurse and a layperson with heart failure on an intervention group of 156 heart failure patients. A control group of 109 received usual care of outpatient care with heart failure nurse and/or a cardiologist. Data was collected at baseline, six weeks, six months and 12 months and included data on self care behaviour via the disease specific European Heart Failure Self-Care Behaviour Scale (Jaarsma, Stromberg, Martensson & Dracup, 2003) and quality of life via another disease specific tool Kansa City Cardiomyopathy Questionnaire (Green, Porter, Bresnahan & Spertus, 2000) and also the non disease specific RAND-36 (Hays, Sherbourne & Mazel, 1993). Even though the questionnaires used in this randomised controlled trial were different from those used in this evaluation the data retrieved would give an indication of the usefulness of the programmes.

The researchers specified that completion for this programme and therefore further assessment at six weeks onwards was by completion of three of the six sessions representing only a 50% adherence to the programme. The mean age for participants of the randomised controlled trial was 66 which is similar to the mean age (70) in this evaluation however there was a higher percentage of males (75%) in the randomised controlled trial compared to 66% in this evaluation.

The quality of life and self-care behaviour outcomes were secondary to the main aims and objectives but were the main focus for this literature review. Analysis showed

that both the physical element of quality of life and self-care behaviour were significantly improved in the short term (from baseline to post intervention six weeks) which then became non significant at the six and 12 month follow up. It was identified that programmes may need to be longer or more substantial or possibly include a series of booster sessions in the longer term to address changes and adapt to any deterioration in condition.

The 2009 SEARCH study (Sullivan et al.) looked at the impact of a more psychological approach to a group intervention for heart failure patients. The study trialed meditation, coping skills and discussion group to improve depression and clinical symptoms for these patients. Even though primary outcomes for the study were the impact on clinical symptoms and anxiety and depression, quality of life was assessed and showed a significant improvement within the treatment group at 12 months. A major limitation to the study was that allocation was based on geography due to travel time to the centre and the treatment group had more severe heart failure patients with higher NYHA class at baseline which may have impacted on the self-care behaviour as those with higher NYHA class may have more motivation to self-care due to experiencing more symptoms of heart failure (Rockwell & Riegel, 2001) when compared to the non treatment group as they had the most gains to make. This American study used a multidisciplinary team of a cardiologist, a nurse, a psychiatrist and a counsellor which would be considered gold standard care in this type of programme and would be paid for as part of the participants' health insurance. The cost of such an intervention to the health care system in the UK however could very well outweigh the benefits to patients. The programme does however look at a different way of approaching DMPs for heart failure in that it attempts to tap into the emotional coping strategies rather than just physical coping strategies. It could signal that a combination of the two may be considered in future programmes.

An earlier randomised controlled trial by Shively et al. (2005) looked at the impact of a behavioural management programme on the quality of life for patients with mild heart failure. This programme was a four month intervention with 16 month follow up and quality of life was measured via the MLHFQ along with the SF-36 (Ware et al., 1995). There was a relatively small sample size of 58 in each of the usual care group and intervention group. The intervention itself was based on the 'information-behaviour-motivation' model with patients receiving four two hour sessions and three telephone calls over the four month period which focused on behaviour change through goal setting and individualised health plans and also cognitive and behavioural skills to deal with negative health and emotional behaviours.

The sample in this randomised controlled trial were 95% male and mainly well functioning heart failure patients in NYHA class I or II and so therefore not wholly representative of the patients who may usually attend DMPs and the participants of the LWP but this trial did use the MLHFQ as measure of quality of life and found that there was a significant improvement in the physical dimension of the MLHFQ however this same difference was not found in the emotional dimension of the questionnaire.

2.5: Relaxation Therapy for Heart Failure Patients.

Relaxation therapy is a behavioural therapy used to release bodily tensions and to promote positive thinking to aid in coping in times of stress. Relaxation therapy also has the physiological effect of inducing a lower heart rate and vascular resistance (Peveler & Johnston, 1986) which is crucial in the long term management of heart failure by reducing myocardial workload. There is increasing evidence with regards to the positive effects of relaxation therapy on patients with angina, myocardial infarction and coronary artery bypass graft patients (van Dixhoorn & White, 2005) however evidence of the effects on patients with heart failure is less substantial. Two early small studies (Kostis, Rosen,

Cosgrove, Shindler & Wilson, 1994, Moser, Dracup, Woo & Stevenson, 1997) have shown that progressive muscular relaxation training can improve mood however the use of relaxation therapy with any other non-pharmacological intervention makes it difficult to determine whether any improvement in mood and quality of life is related to the relaxation or other intervention. A 2002 pilot study of a stress management programme (Luskin, Reitz, Newell, Quinn & Haskell) demonstrated an improvement in the well being of their 29 participants. However this evidence should be treated with caution due to its small scale non-randomised nature.

A more recent randomised controlled trial by Yu, Lee & Woo (2009) studied the effects of progressive muscular relaxation therapy on quality of life. Results showed that after 12 weeks of self-practice quality of life was indeed significantly improved. Although the numbers in this trial were relatively small (59 experimental group, 62 control) the randomised nature of the study gives a more robust level of data. However there is still not enough quantity or quality of data on relaxation therapy in heart failure patients to be able to draw any definite conclusions as to it's effectiveness as an intervention to improve quality of life.

A systematic review of DMPs for heart failure patients by Yu, Thompson and Lee (2006) concluded that the ideal DMP for optimum outcomes in line with European Society of Cardiology guidelines (Dickstein et al., 2008) should incorporate:

1. In patient care including optimising medicine clinical status and patient education to develop a complete discharge plan.
2. Exercise training (where appropriate) and psychosocial care to include stress management and relaxation.
3. Optimising medical therapy and periodic review by a specialist nurse.

The work involved in this study is addressing part of the second recommended element of the DMP but does not include exercise training.

2.6: Gender Differences in Quality of Life and Self-Care Behaviour.

Even though incidence of heart failure is higher in men than women, prevalence is similar (Ho, Pinsky, Kannel & Levy, 1993a). This is because women are older on diagnosis and they tend to survive longer than men (Ho, Anderson, Kannel, Groossman & Levy, 1993b). This improved survival is likely to be due to the disease aetiology in women where they have more diastolic dysfunction as opposed to ventricular dysfunction (Samuel, Hausdorff & Wei, 1999). Improved survival does not, however, mean improved quality of life. An early study by Chin & Goldman (1998) found that women's physical health related quality of life was significantly less improved at 12 months than for men and this seemed to echoed in the same year in a small pilot descriptive study of 30 women by Bennett, Baker & Huster (1998) where quality of life appeared to be worse in women who reported greater impact from physical symptoms.

A later study by Riedinger et al. (2001) again appeared to mirror these earlier findings where after controlling for physical status, women had significantly worse social and physical functioning quality of life than men which restricted their ability to maintain their caring and homemaking role which appears central to the older female role. Conversely a later study by Riegel et al. (2003) found that there is very little difference between the genders in quality of life. The authors did note that quality of life was slightly worse in women upon enrollment into the study but that this evened out at the three month follow up. A 2003 review by Stromberg & Martensson (2003b) also concluded that women appear to have worse quality of life than men however gender has seldom been analysed separately and most studies appear to have more men than women even though prevalence is similar. Hou et al. (2004) also agreed that women, particularly younger women, appear to have poorer quality of life than men at both baseline and at six months however it should be noted that this was a study conducted mainly amongst African-Americans (61%). A 2006 UK study by Gott et al. also concluded that being

female was an independent predictor or worse quality of life. It is also important to note that quality of life is also measured by many different tools across these studies and again it is difficult to compare the result and draw definitive conclusions.

There may be an assumption that self-care behaviour is more prevalent in women than in men however in heart failure self-care there is little evidence to support or refute this assumption. In fact many studies have revealed that there is no significant gender difference in self-care behaviour (Artinian, Magnan, Sloan & Lange, 2002a, Eastwood, Travis, Morgenstern & Donaho, 2007, Holst, Willenheimer, Martensson, Lindholm & Stromberg, 2007, Jurgens, Fain & Riegel, 2006a, Lupon et al., 2008, Ni et al., 1999, Riegel, Dickson, Kuhn, Page & Worrall-Carter, 2010a) and that the differences that do occur in self-care are due to factors other that gender.

A more recent multi national study by Lee at al. (2009) using the Self-Care in Heart Failure Index (SCHFI) tool found that there was a significant difference in self-care maintenance behaviour in favour of males but that there was no difference in self-care management or confidence in performing self-care activities. In the sub analyses it was found that those with diastolic heart failure (predominantly women in this study) had poorer self-care maintenance behaviour and confidence in self-care. Like those studies mentioned previously the authors of this study also concluded that difference in self-care behaviour is due to factors other than gender. It has been suggested that the difference in self-care is due to the facilitators and barriers - for example males are better able than females to interpret their symptoms as being related to heart failure and to respond to it by initiating treatment (Riegel et al., 2010a). This mixed methods study was a very small sample with only 30% of respondents being female and the results of which should be viewed with caution. In a recently published secondary analysis of previous data (Dickson, Worrall-Carter, Kuhn & Riegel, 2011) it has been suggested that men are more likely than women to assume an active role in self-care and to see is it as primarily their

responsibility. The data did show however that women had higher self-care maintenance scores and also a trend towards better self-care management scores than men.

There is most definitely gender bias in recruitment into studies as the majority of studies are related to left ventricular systolic dysfunction which as seen previously is biased towards men due to the nature of the disease (Azevedo, 2008). Therefore by the very nature of this there will always be a lower than representative number of females and the data from these smaller sample sizes may not be generalised.

2.7: NYHA Class Differences in Quality of Life and Self-Care Behaviour.

NYHA class appears to strongly correlate with quality of life (Gott et al., 2006, Hobbs et al., 2002, Juenger et al., 2002, Seto et al., 2011). Juenger et al. (2002) found that those in NYHA III had significantly worse quality of life than those in NYHA II. It is worth noting however that this was a German study and the participants were mainly male and either retired or unemployed. Hobbs et al. (2002) observed as part of the ECHOES study that those heart failure patients who were asymptomatic had similar quality of life scores as the random population sample and that significantly worse impairment of quality of life was found in those with more severe heart failure as measured by NHYA class. As moving down NYHA class appears to improve perception of quality of life (Hobbs et al., 2002), it should be a target of any disease management programme in order to improve heart failure patients' quality of life.

In a recent study by Buck et al. (2011a) older adults with moderate to severe heart failure appear to have improved quality of life where their self-care confidence is good. This is also backed up by Seto et al. (2011) who found that improved self-care confidence is an indicator of improved quality of life. This evidence may suggest that interventions should focus on improving self-care confidence where looking to improve quality of life and this is so even in NYHA class IV patients.

Riegel et al. (2011) recently suggested that those who are asymptomatic, and therefore a lower NYHA class, tend to fail to fully engage in self-care until they experience a decline in condition leading to worsening symptoms. The patients without limitations may not be adequately motivated to engage in self-care behaviour whereas symptomatic patients are more likely to perform self-care strategies in an effort to reduce the limiting symptoms of heart failure (Rockwell & Riegel, 2001, Seto et al., 2011). Conversely Lee et al. (2009) found that having a higher NYHA class was actually associated with worse self-care. As can be seen the relationship between NYHA class and self-care is not always consistent as some studies have found that those with fewer symptoms actually have better self-care (Chriss, Sherposh, Carlson & Riegel, 2004, Suwanno, Petpichetchian, Riegel & Issaramalai, 2009). It may be that larger sample sizes may be able to give a more definitive answer in self-care differences in NYHA classes.

2.8: Age Differences in Quality of Life and Self-Care Behaviour.

Seto et al. (2011) have recently suggested that older patients with heart failure appear to have improved quality of life and better self-care. The reason for this is unclear but a possible explanation may be that experienced, and therefore usually older, heart failure patients are more experienced in self-care and with confidence to self-care comes improved quality of life (Buck et al., 2011a). Older people also tend to be retired and have fewer demands on their time than younger employed people. Hou et al. (2004) noted that quality of life was worse in those aged under 65 appearing to add weight to the evidence of Seto et al. (2011) however as previously noted this sample is not representative of the UK population. However in a 2006 UK study (Gott et al.) of 542 heart failure patients on primary care registers it was noted that older people had worse general quality of life but not heart failure related quality of life. This may suggest that age-related quality of life changes, such as increased frailty, are likely to compound the

heart failure related quality of life issues. A recently published study Buck & Riegel (2011b) looked at the impact of frailty on quality of life in heart failure patients and found that there is in fact a significant bearing on quality of life. It may be prudent to assist older patients in controlling comorbid conditions and improve frailty through exercise training where appropriate to assist in improving overall health related quality of life.

Younger heart failure patients tend to be more symptom aware than older patients (Baas, Beery, Allen, Wizer & Wagoner, 2004, Jurgens et al., 2006a) and this may due to increased somatic awareness in younger patients, possibly accounting for better self-care (Cameron et al., 2010). Even though one study has shown that older patients are more inclined to seek care for symptoms (Jurgens, 2006b), a more recent study has shown that older patients are less likely to recognise their symptoms (Riegel et al., 2010a). Although the extent to which age influences self-care expertise is unclear, it has been proposed that uncertainty and age-related changes in the ability to sense stimuli originating within the body to explain the differences between younger and older patients (Cameron, 2001).

2.9: Participant Knowledge of Heart Failure.

Increased knowledge does not necessarily correlate with improved adherence (Ni et al., 1999). However, knowledge is not always needed for patients to be compliant with treatment or performing self-care. It is common for patients to comply with medical treatment without knowing the names or the effects of the drugs. However, lack of knowledge can be problematic, for example, when a patient complies with self-care behaviour such as daily self-weighing and recording of weight, without knowing that weight gain could be a sign of deterioration and that medical attention may need to be sought.

Evidence around the level knowledge in heart failure patients in general is very poor. An early study by Ni et al. (1999) found that knowledge on self-care behaviour is

poor and even when patients have received education around heart failure they do not consider themselves to be well educated or have comprehensive knowledge about their condition (Sneed & Paul, 2003). Interventions for not only educating but encouraging self-care behaviours with continued support and motivation would seem to be key in adhering to behaviour change.

Two studies (Caldwell, Peters & Dracup, 2005 & DeWalt et al., 2006) which looked at knowledge as an outcome of their intervention demonstrated improved knowledge but did not investigate the difference in knowledge between genders or indeed NYHA classifications or age. However both of these studies had very low numbers – 20 and 23 respectively – and therefore the results should be looked at with caution.

Some differences in knowledge due to age have been found (Artinian, Magnan, Christian & Lange, 2002a, Ni et al., 1999) but differences in knowledge according to gender are inconclusive. Ni et al. (1999) showed that women had significantly better knowledge than men, while Artinian et al. (2002b) found no gender related difference. Both Ni et al. (1999) and Artinian et al. (2002a) found that younger patients (<75 years) had significantly better knowledge than older patients. These studies of educational interventions show that there is a gap between patients receiving and retaining information on self-care in heart failure and focus should be placed on addressing the barriers that patients face in implementing their knowledge into action.

2.10: Conclusion.

It is difficult to draw any strong conclusions about the benefits of DMPs on patient knowledge, self-care behaviour and quality of life in patients with heart failure as there are very few studies focusing on these as a primary outcome. In fact in a 2008 review of the literature, Grady found that only nine out of 17 RCTs showed a significantly greater improvement in quality of life than the usual care groups.

It is clear that symptom burden from heart failure, particularly difficulty sleeping, lack of energy, difficulty concentrating and shortness of breath causes distress to patients and therefore a reduced quality of life (Zambroski, Moser, Bhat & Zeigler, 2005). What is unclear however is the manner in which an intervention to improve self-care behaviour should be delivered and also who by as most of the evidence to date is around delivery via a clinician. It is also unclear from the evidence as to where is the best location to deliver these interventions for maximum impact and what length of time the interventions should be and also if long term support systems should be implemented to maintain patient motivation.

Addressing poor quality of life and poor self-care behaviour through DMPs is important in all groups of patients whilst paying particular attention to improving NYHA class through self-care behaviour as this appears to improve health related quality of life.

Chapter 3. Method.

3.1: Introduction.

This retrospective service evaluation compared data collected from participants who completed the first Living Well programme (LWP), which took place in Burnley, East Lancashire and was conducted in 2010. The data included pre and post programme scores collected from the MLHFQ (Rector, Kubo & Cohn, 1987), the SCHFI (Riegel, Lee, Dickson & Carlson, 2009) and a patient knowledge questionnaire (PKQ) (Lainscak & Keber, 2005) from the same population.

Differences which may have been found across the group were analysed both within and between gender, age groups and NHYA classification

3.2: Ethics.

Ethical clearance for this retrospective study was granted by the University of Chester Ethics Committee (Appendix A). Participants signed a declaration giving permission for their data to be used for service evaluation purposes (Appendix B).

3.3: Participants.

All heart failure patients registered with ELHFSNS with a Burnley postcode (BB10, BB11 & BB12) were invited to attend the programme by an invitation letter (Appendix C) given to them by their HFSN during a clinic appointment. All the nursing team were briefed as to the content of the programme and were keen to promote the LWP as part of condition management for their patients.

Issuing potential participants with an invitation letter, which includes information on programme content, venue, dates and times and a telephone number which to contact to reserve a place and had been identified as the most appropriate method to recruit future participants. The onus would be placed upon on the participants to ring and book a place

as not only would it gauge motivation to take part but this would also be taken as informed consent to participate.

To allow heart failure patients who are working to have the opportunity to attend it was decided that the initial LWP should take place early evening 1800 to 19.30 hours. The LWP was held one evening a week for six weeks at the award winning St Peter's Health and Leisure Centre, Burnley as this facility was deemed as being both central and accessible for the participants and was led by BBC's CRP with clinical input from the ELHFSNS. The programme also included a visit by an 'expert patient' with heart failure who was able to share their personal experience of managing heart failure with the group.

Upon making contact with the CRP the participant was given full instructions as to how to access the venue and the designated meeting point and also a full description of the content and the aims and objectives of the LWP. Participants were also given the opportunity to withdraw from the LWP at any time without explanation.

As there is currently no heart failure rehabilitation service in East Lancashire and therefore no referral pathway it was extremely difficult to forecast the numbers of participants who would like to enrol on the LWP. As this programme was experimental in nature and was only planned initially to be a single block of six weeks there was no opportunity to gather data from numerous programmes. A total of 25 enrolled on the programme, four did not attend the first session and the remaining 21 completed the full six-week programme.

3.4: Inclusion Criteria.

The inclusion criteria for the LWP were that the participants should be either (a) a BBC resident with a BB10, BB11 or BB12 postcode and/or (b) be registered with a BBC General Practitioner and be registered with the ELHFNS with a diagnosis of heart failure. Males and females of any age were accepted onto the LWP. There was no exclusion to

the programme by condition severity or co-morbidity as there was no exercise included in the LWP.

3.5: Exclusion Criteria.

There were no exclusion criteria for entry to the programme.

3.6: Programme Design.

The LWP was a six-week programme which lasted for one and half hours each week. The full structure and content can be seen in Appendix D.

The three main aims of the LWP were to improve participants' quality of life, self-care behaviour and knowledge of their condition. To promote improved knowledge and self-care each session included a health education component with the purpose of both engaging participants in interactive learning and enabling important self-care messages to be imparted. This education component also facilitated goal setting for improved self-care behaviour on a weekly basis. An important part of the sessions was the allocated social time, which included a cup of tea or coffee and an informal opportunity to ask the CRP questions and interact with other participants. Lastly a relaxation session allowed the CRP to teach the group correct breathing techniques and other forms of relaxation techniques to aid in reducing both condition related breathlessness and stress and anxiety.

Each session was supported by British Heart Foundation (BHF) education publications (Appendix E) for participants keep and refer to when required. Participants were also encouraged to register with the BHF either online or via telephone to receive their bi-monthly Heart Matters magazine for ongoing informational support. Both during and after the programme participants had access to a telephone number for the group facilitators for personal support if required.

3.7: Questionnaires.

Participants were asked to complete three validated questionnaires pre and post programme in an attempt to assess any differences in health-related quality of life (hereafter known as quality of life), self-care behaviour and knowledge as a result of attending the LWP. The questionnaires were:

1. Minnesota Living With Heart Failure Questionnaire – evaluating quality of life (Appendix F)
2. Self Care of Heart Failure Index version 6 – evaluating self-care behaviour Appendix G)
3. Patient Knowledge Questionnaire – evaluating changes in knowledge (Appendix H)

The MLHFQ (Rector et al., 1987) is a wifely used, disease specific tool and was designed to measure the effects of heart failure and treatments for heart failure on an individual's quality of life. The content of the questionnaire was selected to be representative of the ways heart failure can affect the key physical, emotional, social and mental dimensions of quality of life without being too long to administer. To measure the effects of heart failure symptoms, functional limitations and psychological distress on an individual's quality of life, the MLHFQ asks each participant 21 questions which are rated using a 6-point (zero to five) Likert scale how much each affects their daily life.

The questionnaire assesses the impact of frequent physical symptoms - shortness of breath, fatigue, peripheral oedema, and difficulty sleeping - and psychological symptoms of anxiety and depression, along with physical and social functioning. Although the MLHFQ was not designed to be able to measure different key dimensions of quality of life separately it does provides an excellent overall view of an individual's quality of life. Clinical meaningfulness in terms of interpreting the scores has been cited as being a reduction in the score of five points or more (Rector, 2005).

The MLHFQ is 'user friendly' for participants and the group facilitator as it requires little explanation and takes relatively little time to complete and it is also simple to score. It was for this ease of use, reliability, validity and specificity that the MLHFQ was chosen to assess quality of life.

The chosen method of evaluating the difference in self-care behaviour was the SCHFI version 6 (Riegel et al., 2009). The 22-point scale is disease specific and measures 3 facets of self-care – management, maintenance and confidence. Each section of the scale can also be scored separately allowing for asymptomatic patients to have a self-care behaviour score. Adequacy of self-care is judged by a score ≥70 for each component of the scale (Riegel et al., 2009) however, even though this may be a useful guideline it also depends upon the outcome of interest and the proportion of increase at each point in time. Even though the SCHFI scores are time consuming to calculate it does provide a score for each element of self-care and the questionnaire is relatively easy to complete. The SCHFI is a well-known and frequently used tool with good reliability and validity.

There are very few validated disease specific knowledge questionnaires available. The 10 question PKQ (Lainscak & Keber, 2005) was selected due to its ease of use for participants having 'yes' or 'no' answers for all but one of the questions and also for its ease of scoring.

Along with these validated questionnaires the participants completed a LWP evaluation on the final week (Appendix I). This gave the participants the opportunity to comment on the content and delivery of the LWP and also to give suggestions for future LWPs.

3.8: Statistical Analysis.

All data for analysis was collected by myself from the questionnaires stated earlier which were issued on week six and this data was from those who completed all six weeks of the LWP. Data was investigated to ensure assumptions of normality ($p > 0.05$) using the Shapiro-Wilk test, utilised due to the number of participants being less than 100 (Coakes & Steed, 2003).

As all the questionnaire data collected was of parametric level paired samples t tests were performed to investigate the differences within the chosen groups of gender, NYHA Classification and age. Where the assumption of normality was violated the appropriate non-parametric test was performed: Wilcoxon Signed Ranks test.

It was also decided to investigate the difference between groups and the appropriate parametric test was chosen: either the independent samples t test for the gender and NYHA groups or one-way independent groups ANOVA for the age group categories. The Levene's test for homogeneity of variance ($p > 0.05$) was conducted to confirm that there was no statistically significant difference between the group variables. Where this assumption was violated the appropriate non-parametric test was performed: either Mann-Whitney U test of Kruskal Wallis ANOVA.

When a test for significance was conducted the data was investigated at a probability error of less than 5% ($p < 0.05$).

Participant data collected was separated out into gender, NYHA classification and age groups and within groups test performed against each separate category. Further tests for between gender, NYHA classes and age group differences for each set of data were also conducted and this large number of tests (30 within subject tests, and 15 between subject tests) generated a great number of results to discuss.

Chapter 4. Results.

4.1: Introduction.

This section details the results collected from the participants during the LWP at pre and post programme stages and begins by presenting descriptive data for each of the independent variables. This will provide an overview of the findings before statistical analysis using the Statistical Package for Social Sciences (SPSS, version 18.0) software.

4.2: Participants.

A total of 21 participants completed the LWP (14 males, 67 yrs ±13 (range 45-82) & 7 females, 72 yrs ± 9 (range 59-83)).

Of those 12 were NYHA Class II (Age range 45-79, 9 males, 3 females) and 9 were NYHA Class III (Age range 67-83, 5 males, 4 females). There were no NYHA Class I or IV participants taking part in this retrospective evaluation.

For the purposes of data analysis the participants were also split into two age groups – 10 in the 40 to 69 year old category (8 males, 2 female) and eleven in the 70 to 89 year old category (6 males, 5 females).

Table 1 below shows a summery of the overall results for each of the variables measured

Table 1 Summary of overall results

	Baseline	Following 6 week LWP	Percent change (%)	*p* value
Quality of Life	51 ± 17	45 ± 15	12%	0.005
Patient Knowledge	4 ± 1	8± 1	100%	0.005
Self-Care Maintenance	40 ± 10	68 ± 12	70%	0.005
Self-Care Management	32 ± 13	53 ± 12	66%	0.005
Self-Care Confidence	38 ± 21	62 ± 24	63%	0.005

4.3: Quality of Life Results.

Data collected from the MLHFQ pre and post programme was used to assess any overall significant improvement in quality of life for participants of the LWP. The group was then separated out into males and females, NYHA Class II and III and also into age groups and further tests were performed to investigate whether there were any significant improvements both within and between each of the groups.

An overall analysis of all 21 LWP participants demonstrated that the pre intervention mean MLHFQ score was 51 ± 17 (Confidence Interval (CI) 43 to 58) and the post intervention mean was 45 ± 15 (CI 38 to 52) (Table 1). A paired samples t test demonstrated a significant overall improvement in MLHFQ score of 12% across all participants (p=0.005) and the null hypothesis that there is no improvement in quality of life for participants of the LWP can be rejected.

4.3.1: Gender.

Comparisons of the pre and post LWP results (Figure 1) demonstrate that in the MLHFQ scores males recorded a pre programme mean score of 49 ± 21and post programme score of 43 ± 19 and females recorded a pre programme mean score of 54 ± 5 and 47 ± 5 post programme. Following the six-week LWP males demonstrated a 12 % (6 ± 4, CI 4 to 9) improvement on their MLHFQ score and females a 13% (6 ± 2, CI 4 to 8) improvement.

A paired samples t test was performed for each group and the results demonstrate a significant difference between the pre and post LWP scores for both males (p=0.05, 6 ± 4, CI 4-9) and females (p=0.05, 6 ± 1, CI 4-8) indicating that there is a significant improvement in quality of life for each group post intervention and the null hypothesis that there is no significant difference in quality of life for both and females can be rejected.

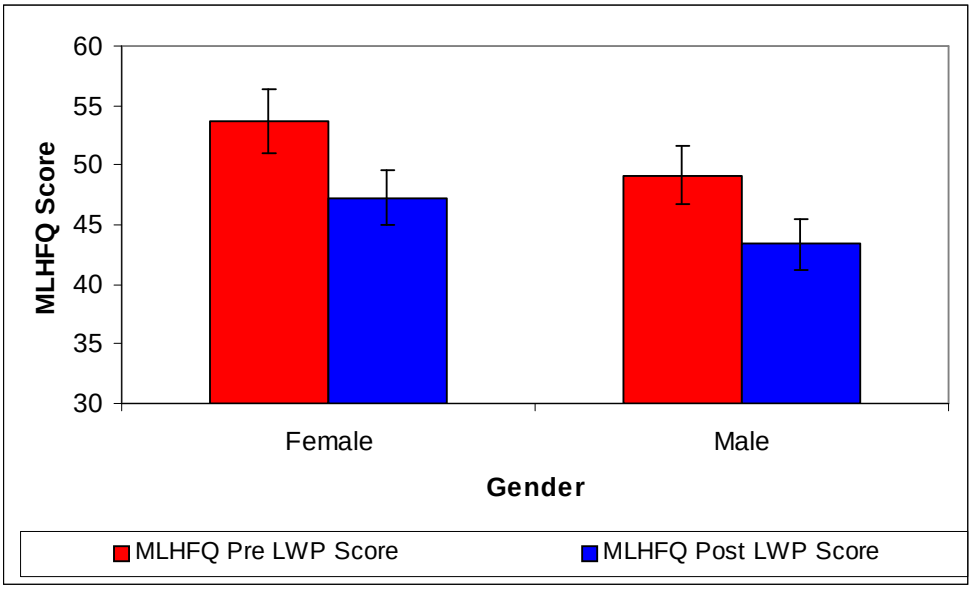

Figure 1. Mean MLHFQ scores by gender pre and post LWP

An independent t test was performed on the mean difference in scores between males and females (Table 2), however there was no significant difference found in MLHFQ scores (p=0.666) therefore the null hypothesis that there is no significant difference in improved quality of life between males and females can be accepted.

Table 2. Gender mean differences in MLHFQ scores independent t test result

	Mean Score	Standard Deviation ±	95% confidence interval	*p* Value Sig. (2 tailed)
Males	6	4	4-8	0.666
Females	6	2	4-8	

4.3.2: NYHA Classification.

Comparisons of the pre and post LWP MLHFQ scores for each of the NYHA classifications show that NYHA class II participants had a pre intervention mean score of 46 ± 17 (range 18-68). The mean score post intervention for the NYHA class II group

demonstrated a reduction in the score of 6 (13%) to 40 ± 14 (range 14-56) with a paired samples t test demonstrating a statistically significant improvement (p=0.05) in quality of life allowing the null hypothesis that there is no significant difference in improvement in quality of life for NYHA class II participants to be rejected.

NYHA class III participants had a pre intervention mean score of 57 ± 16 (range 25-84). The mean score post intervention demonstrated a reduction of 5 (9%) to 52 ± 15 (range 22-78) again indicating a significant improvement (p=0.05) by means of a paired samples t test in quality of life for NYHA class III participants again allowing the null hypothesis in regards to NYHA class III participants to also be rejected.

An independent t test (Table 3) performed on the difference in the mean MLHFQ scores between NYHA class II and class III groups demonstrates there is no significant difference in quality of life between the two groups (p=0.891) therefore accepting the null hypothesis that there is no significant difference in quality of life between NYHA class II and class III participants post intervention.

Table 3.NYHA class mean difference in MLHFQ scores independent t test result

	Mean Score	Standard Deviation ±	95% confidence interval	*p* Value Sig. (2 tailed)
NYHA Class II	6	4	4-9	0.891
NYHA Class III	6	2	4-7	

4.3.3: Age Group.

Paired samples t tests were conducted to investigate the null hypothesis that there is no significant difference in quality of life within the two age groups post intervention. The 40-69 year old group pre programme intervention score was 48 ± 18 (range 50-68, CI 56-61) and post programme mean of 42 ± 15 (range 47-61, CI 31-52). This demonstrated

a mean score reduction of 6 ± 4 (CI 4 to 9) representing a statistically significant improvement (p=0.005) in quality of life. The 70 to 89 year old group also recorded a statistically significant improvement (p=0.005, 7 ± 2, CI 4 to 7) in quality of life having a pre intervention mean score of 53 ± 17 (range 24-84, CI 41-64) and post intervention mean score of 47 ± 16 (range 22-78, CI 37-58). The null hypothesis may be rejected for both age groups.

An independent t test was then performed to investigate the difference in mean MLHFQ scores between the age groups and no significant difference was found (p=0.411) and the null hypothesis that there is no significant difference between the age groups can be accepted.

4.4: Participant Knowledge Results.

Data analysis was performed to investigate the null hypothesis that there is no significant difference in knowledge both within and between all the identified categories. Overall analysis of the PKQ scores via a Mann Whitney U test (Table 1) for the 21 participants demonstrated a pre intervention mean score of 4 ± 1 (CI 3 to 4) and post intervention score of 8 ± 1 (CI 7 to 8) representing a significant improvement of 100% (p=0.005) in knowledge post LWP across all participants and the null hypothesis can now be rejected.

4.4.1: Gender.

Mean difference in PKQ scores in each of the gender groups demonstrate the males increased their PKQ score by 100%, having a mean pre intervention score of 4 ± 1 (range 2-6) and post intervention the males had a mean score of 8 ± 1 (range 5-10). The females increased their PKQ score by 133% with a mean score pre intervention was 3 ± 1 (range 2-6) and the post intervention score being 7 ± 1 (range 6-9).

A paired t test demonstrated that both males (p=0.005, -4 ± 1, CI –4 to –3) and females (p=0.005, -4 ± 1, CI –5 to –3) had a significant difference in their mean scores and therefore rejecting the null hypothesis that there is no significant improvement in knowledge for both males and females post LWP.

A Mann-Whitney U test was performed on the PKQ score differences between males and females groups (Table 4) highlighting a non-significant difference (p=0.483) and therefore accepting the null hypothesis that there is no significant difference between males' and females' knowledge post LWP.

Table 4. Gender PKQ scores Mann-Whitney U test result

	Shapiro-Wilk	Mean score difference	Standard Deviation ±	95% confidence interval	*p* Value Asymp Sig (2-tailed)
Males	0.96	4	1	3 to 4	0.483
Females	0.016	4	1	3 to 5	

4.4.2: NYHA Classification.

Comparisons of the pre and post LWP PKQ scores (Figure 2) for both of the NYHA classifications show that NYHA class II participants had a pre intervention mean score of 4 ± 1 (range 3-6). The mean score post intervention for the NYHA class II group demonstrated an improvement in PKQ score of 4 (100%) to 8 ± 1 (range 7-10) showing a statistically significant improvement (p=0.005, -4 ± 1, CI –5 to -4) in knowledge.

NYHA class III participants had a pre intervention mean score of 3 ± 1 (range 2-5). The mean score post intervention demonstrated an improvement in PKQ score of 3

(100%) to 6 ± 1 (range 5-8) again indicating a significant improvement (p=0.005, -3 ± 1, CI –4 to -3) in knowledge for NYHA class III participants.

The null hypothesis that there is no significant improvement in knowledge for both NYHA class II and class III participants can therefore be rejected.

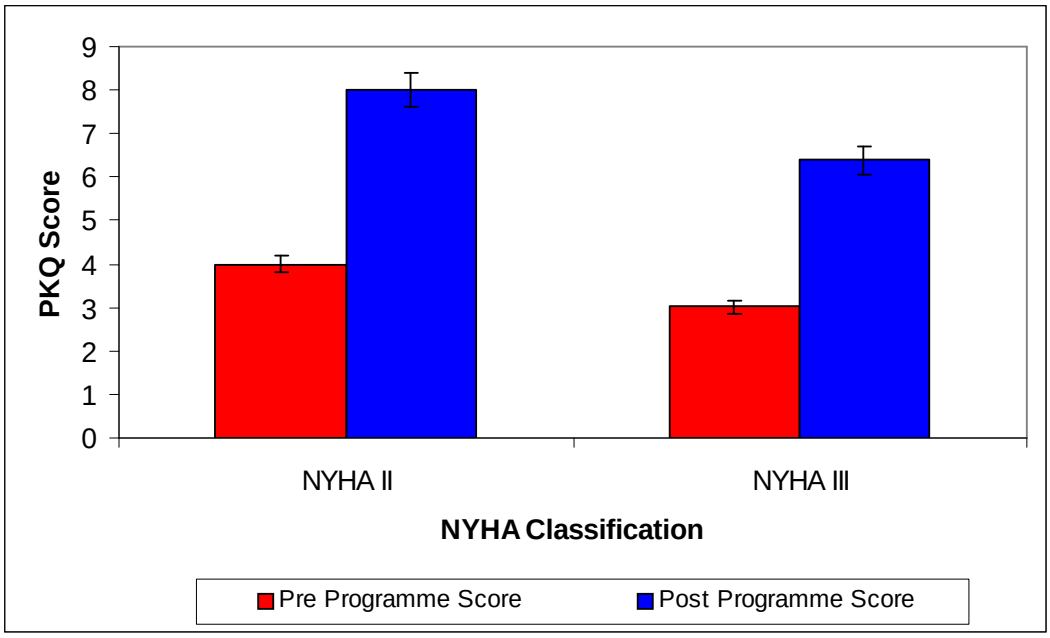

Figure 2. Mean PKQ scores by NYHA class pre and post LWP

To investigate the difference in PKQ score difference between the NYHA classifications a Mann-Whitney U test was performed (Table 5). The test demonstrated that there was no significant difference in PKQ scores between the groups (p=0.103) and the null hypothesis that there is no significant difference in knowledge between the NYHA classes can be accepted.

Table 5. NHYA class PKQ score difference Mann-Whitney U test result

	Shapiro-Wilk	Mean score difference	Standard Deviation ±	95% confidence interval	*p* Value Asymp Sig (2-tailed)
NYHA Class II	0.006	4	1	4 to 5	0.103
NYHA Class III	0.364	3	1	3 to 4	

4.4.3: Age Group.

Data collected and analysed from the PKQ by age group demonstrate that the mean pre intervention scores in the 40 to 69 year old category was 4 ± 1 (range 3-6, CI 3-5) and the mean post intervention score 8 ± 1 (range 7-9, CI 6-10). This indicates a 100% increase in the mean score representing a statistically significant (p=0.005) improvement in knowledge for this age group.

Within the 70 to 89 year old category the pre intervention mean PKQ score was 3 ± 1 (range 2-5, CI 3-4) and the mean post intervention score was 7 ± 1 (range 5-9, CI 6-8) again representing a statistically significant (p=0.005) 133% improvement in knowledge. The null hypothesis that there is no significant improvement in knowledge post LWP can therefore be rejected for these categories.

A Mann Whitney U test was then conducted to investigate any differences in knowledge between the mean PKQ score differences. After analysis it was established that there was no significant difference in knowledge between the age groups (p=0.971) enabling the null hypothesis that there is no significant difference in improvement in knowledge between the age groups to be accepted.

4.5: Self-Care Behaviour Results.

The SCHFI separates into three separate elements - maintenance, management and confidence. Although a large amount of data has been generated from the analysis of the SCHFI through the separation of the scores into these three categories it enables a more accurate picture of self-care behaviour of the LWP participants.

4.5.1: Self-Care Maintenance Results.

This section of the questionnaire measures self-care behaviour in terms of the frequency of performing activities which will maintain health and encourage the participant to remain symptom free e.g. eating a low salt diet, taking regular exercise etc.. Data analysis was performed to investigate the null hypothesis that there is no significant difference in self-care maintenance behaviour both within and between all the identified categories. Overall analysis of the scores for the 21 participants demonstrated a pre intervention mean score of 40 ± 10 (CI 44 to 54) and post intervention score of 68 ± 12 (CI 62 to 73) representing a significant improvement of 70% (p=0.005, -19 ± 2, CI –18 to -19) in self-care maintenance behaviour post LWP (Table 1) rejecting the null hypothesis that the is no significant difference in self-care maintenance behaviour for LWP participants.

4.5.1.1: Gender.

Mean self-care maintenance scores indicate that males increased their self-care maintenance score by 35% having a pre intervention score of 49 ± 9 (range 33-60) and a post intervention mean score of 66 ± 13 (range 47-83). Females increased their score by 37% having a pre intervention mean score of 49 ± 13 (range 33-70) and a post intervention mean score of 67 ± 12 (range 47-80). A paired samples t test for each gender group indicated that there is a significant difference in self-care maintenance behaviour

for both males (p=0.005) and females (p=0.005) allowing the null hypothesis that there is no significant difference in self-care maintenance behaviour for both males and females post LWP to be rejected.

A Mann-Whitney U test was performed to investigate any differences between males and females scores post LWP and no significant difference was found (p=0.313) therefore the null hypothesis that there is no significant difference in self-care maintenance behaviour between males and females can be accepted.

4.5.1.2: NYHA Classification.

Pre and post intervention self-care maintenance scores for NYHA class II and III participants are shown below in Figure 3 and comparison of the results show that NYHA Class II participants had a pre intervention mean score of 52 ± 11 (range 33-70, CI 45-59) and a post intervention mean score of 73 ± 9 (range 60-83, CI 67-79). After conducting a Wilcoxon Signed Ranks test a significant difference (p=0.002, mean difference –21 ± 10, CI –27 to –15) in self-care maintenance was found post LWP indicating an improvement of 40%. The NYHA Class III participants had a pre intervention mean score of 45 ± 8 (range 33-57, CI 39-51) and a post intervention mean score of 61 ± 13 (range 47-73, CI 49-65) indicating an improvement of 36%. Upon investigation by a paired samples t test a significant difference (p=0.01, mean diff. –16 ± 14, CI –27 to –5) was found post intervention and the null hypothesis that there is no significant difference in self-care maintenance behaviour in both NYHA classes can be rejected.

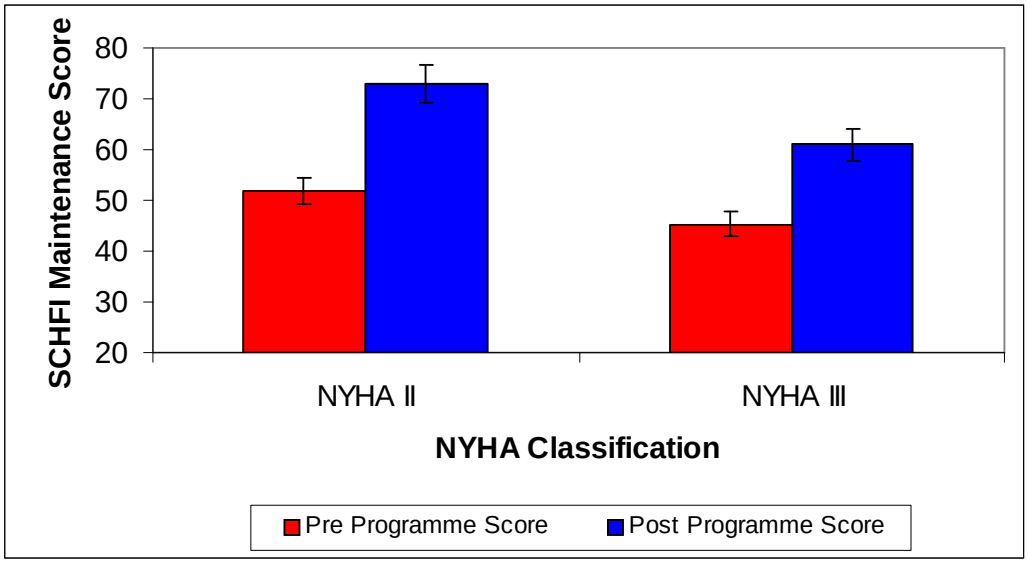

Figure 3. Mean self-care maintenance scores by NYHA class pre and post LWP

A between groups analysis was performed to investigate the null hypothesis that there is no significant difference between the NYHA Class II and Class III participants in terms of improved self-care maintenance behaviour post LWP. As the assumption of normality test was violated the Mann Whitney U test was chosen (Table 6). No significant difference was found between NYHA Class II and Class III participants (p=0.187) and the null hypothesis that there is no significant improvement in self-care maintenance behaviour can be accepted.

Table 6. NHYA class self-care maintenance scores Mann Whitney U test result

	Mean score difference	Standard Deviation ±	95% confidence interval	*p* Value Asymp Sig 2-tailed
NYHA Class II	21	10	15 to 27	0.187
NYHA Class III	16	15	5 to 27	

4.5.1.3: Age Group.

Mean self-care maintenance scores indicate that the 40-69 year old age group improved their self-care maintenance behaviour by 42% having a pre intervention score of 50 ± 11 (range 33-70, CI 42-58) and a post intervention score of 71 ± 12 (range 47-83, CI 62-80). A paired samples t test was performed to investigate significant difference within the group and found that there was a significant difference (p=0.005, mean -20 ± 10) in self-care maintenance score post intervention and the null hypothesis that there is no significant improvement in self-care maintenance behaviour in the 40-69 year old age group can be rejected.

The mean pre intervention self-care maintenance behaviour score for the 70-89 year old age group was 48 ± 9 (range 33-60, CI 41-54) and the post intervention mean score was 65 ± 12 (range 47-83, CI 57-73). A paired samples t test showed there was a statistically significant difference (p=0.001, mean -18 ± 13) of 35% improvement in scores and the null hypothesis that there is no significant improvement in self-care maintenance behaviour in the 60-89 year old age group can be rejected.

Table 7. Between age group self-care maintenance scores independent t test result

	Mean score difference	Standard Deviation ±	95% confidence interval	P Value Sig 2-tailed
40-69	20	10	13 to 28	
70-89	18	13	9 to 27	0.609

Table 7 above indicates that there is no significant difference between the age groups in mean self-care maintenance scores post intervention accepting the null

hypothesis that there is no significant difference in self-care maintenance behaviour between the age groups.

4.5.2: Self-Care Management Results.

This section of the questionnaire measures self-care behaviour in terms of likelihood of performing activities, which will manage symptoms of heart failure and reduce the need for admission to hospital e.g. reducing fluid intake, taking an extra water tablet etc.. Data analysis was performed to investigate the null hypothesis that there is no significant difference in self-care management behaviour both within and between all the identified categories. Overall analysis of the scores for the 21 participants demonstrated a pre intervention mean score of 32 ± 13 (CI 26-38, range 15-60) and post intervention score of 53 ± 12 (CI 48-59, range 30-75) representing a significant improvement (p=0.005) (Table 1) in self-care management behaviour of 66% post LWP and the null hypothesis that there is no significant difference in self-care management behaviour can be rejected.

4.5.2.1: Gender.

Mean self-care management scores for males indicate an improvement of 76% having a pre intervention mean score of 33 ± 12 (range 15-55, CI 26-40) and a post intervention mean score of 58 ± 12 (range 30-75, CI 49-63). Females increased their score by 58% having a pre intervention mean score of 31 ± 14 (range 20-60, CI 18-44) and a post intervention mean score of 49 ± 9 (range 35-60, CI 40-57).

A paired samples t test for the males and a Wilcoxon Signed Ranks test for the females indicated that there is a significant difference in self-care management behaviour for both males (p=0.005) and females (p=0.026) allowing the null hypothesis that there is

no significant improvement in self-care management behaviour for both males and females post LWP to be rejected.

An independent t test was performed to investigate any differences between males and females scores post LWP and as can be seen in Table 8 below no significant difference was found (p=0.251) and the null hypothesis that there is no significant in self-care management behaviour between males and females can be accepted.

Table 8. Gender self-care management behaviour independent t test result

	Shapiro-Wilk	Mean score difference	Standard Deviation ±	95% confidence interval	*p* Value Sig (2-tailed)
Males	0.364	23	9	18 to 28	0.251
Females	0.055	18	9	9 to 26	

2.5.2.2: NYHA Classification.

Mean pre and post intervention self-care management scores for NYHA class II and III participants are shown below in Figure 4 and comparison of the results show that NYHA Class II participants had a pre intervention mean score of 37 ± 14 (range 20-60, CI 28-46) and a post intervention mean score of 59 ± 11 (range 35-75, CI 52-66). After conducting a paired t test a significant difference (p=0.005, mean difference -22 ± 10, CI –29 to –16) in self-care management was found post LWP indicating an improvement of 59%.

The NYHA Class III participants had a pre intervention mean score of 26 ± 7 (range 15-35, CI 21-31) and a post intervention mean score of 46 ± 8 (range 30-55, CI 40-

52) indicating an improvement of 77%. Upon investigation by a paired samples t test a significant difference (p=0.005, mean diff. –20 ± 8, CI –26 to –14) was found post intervention. Therefore the null hypothesis that there is no significant self-care management behaviour for both NYHA classes can be rejected.

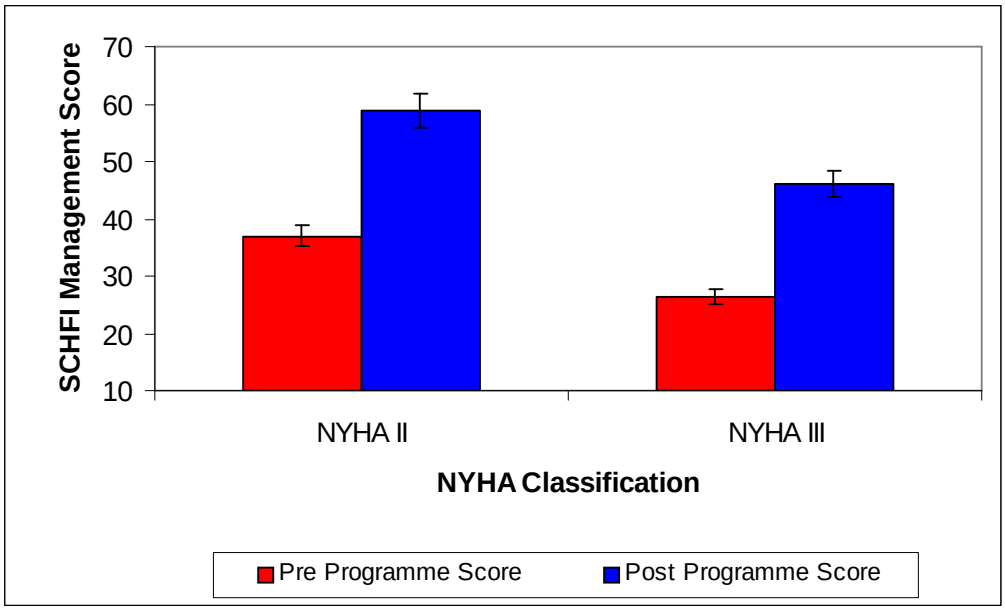

Figure 4. Mean self-care management scores by NYHA class pre and post LWP

A between groups analysis, using a Mann Whitney U test, was performed to investigate the null hypothesis that there is no significant difference between the NYHA Class II and Class III participants in terms of improved self-care management behaviour post LWP (Table 9). No significant difference was found between NYHA Class II and Class III participants (p=0.62) and the null hypothesis that there is no significant difference in improvement of self-care management behaviour between the NYHA classes may be accepted.

Table 9. NHYA class self-care management scores Mann Whitney U test result

	Mean score difference	Standard Deviation ±	95% confidence interval	P Value Asymp. Sig 2-tailed
NYHA Class II	22	10	16 to 29	0.62
NYHA Class III	20	8	14 to 26	

2.5.2.3: Age Group.

Mean self-care management scores indicate that the 40-69 year old age group have a pre intervention score of 32 ± 14 (range 15-60, CI 22-41) and a post intervention score of 56 ± 11 (range 35-75, CI 48-64). A paired t test was performed to investigate significant difference within the group and found that there is a significant difference (p=0.005, mean -25 ± 11) in self-care management score post intervention and the null hypothesis that there is no significant improvement in self-care management behaviour in the 40-69 year old age group can be rejected. The pre intervention self-care management behaviour mean score for the 70-89 year old age group was 33 ± 12 (range 20-55, CI 25-41) and the post intervention mean score was 51 ± 12 (range 30-75, CI 43-59). A Wilcoxon Signed Ranks test showed there was a statistically significant difference (p=0.003, mean -18 ± 6) and the null hypothesis that there is no significant improvement in self-care management behaviour in the 70-89 year old age group can be rejected.

Table 10. Between age group self-care management independent t test result

	Mean score difference	Standard Deviation ±	95% confidence interval	*p* Value Sig 2-tailed
40-69	25	11	17 to 32	
70-89	18	6	14 to 23	0.298

Table 10 above indicates that there is no significant difference between the age groups in mean self-care management scores post intervention.

4.5.3: Self-Care Confidence Results.

This section of the questionnaire measures self-care behaviour in terms of the participants' confidence in both managing symptoms of heart failure and in maintaining positive health behaviours in order to reduce symptoms and hospital readmissions. Data analysis was performed to investigate the null hypothesis that there is no significant difference in self-care confidence both within and between all the identified categories. Overall analysis via a paired t test of the scores for the 21 participants (Table 1) demonstrated a pre intervention mean score of 38 ± 21 (CI 29-48, range 11-90) and post intervention score of 62 ± 24 (CI 51-72, range 17-128) representing a significant improvement (p=0.005) in self-care confidence of 63% post LWP and the null hypothesis that there is no significant difference in self-care confidence in LWP participants can be rejected.

4.5.3.1: Gender.

Analysis of the self-care confidence scores for males revealed a pre intervention mean score of 44 ± 22 (range 11-90, CI 31-56) and a post intervention mean of 67 ±24 (range 33-128, CI 53-81). A paired t test was performed and showed that there was a significant difference (p=0.005, mean diff –23 ±9, CI –29 to –18) in self-care confidence for males and this represents a 52% increase in mean score post LWP.

The pre intervention mean score for females was 28 ± 17 (range 11-61, CI 12-44) and post intervention mean 50 ±19 (range 17-67, CI 32-68). These mean scores represent a 79% increase in mean self-care confidence scores and further analysis via a paired t test showed a significant difference (p=0.006, mean diff –22 ±14, CI –36 to –9) in self-care confidence post intervention. The null hypothesis that there is no significant difference in self-care confidence for both males and females can be rejected.

An independent t test was carried out to investigate the difference between males and females post LWP. Table 11 below details the test results and highlights that there is no significant difference (p=0.809) between the genders post LWP and the null hypothesis that there is no significant difference in self-care confidence between males and females can be accepted.

Table 11. Gender self-care confidence score difference independent t test result

	Shapiro-Wilk	Mean score difference	Standard Deviation ±	95% confidence interval	*p* Value Sig (2-tailed)
Males	0.212	24	9	18 to 29	0.809
Females	0.723	22	14	9 to 36	

4.5.3.2: NYHA Classification.

NYHA Class II participants increased their self-care confidence mean score by 46% with a pre intervention mean of 50 ± 20 (range 17-90, CI 38-63) and a post intervention mean of 73 ± 22 (range 45-128, CI 59-87). NYHA Class III participants increased their self-care confidence mean score by 100% with a pre intervention mean of 23 ± 10 (range 11-33, CI 15-31) and a post intervention mean of 46 ± 16 (range 18-61, CI 34-59). As the test for normality was violated for each category a Wilcoxon Signed Ranks test was carried out for each group and both NYHA Classes significantly improved their mean scores (NYHA Class II p=0.002, NYHA Class III p=0.007). The null hypothesis that there is no significant improvement in self-care confidence for either the NYHA Class II or Class III participants can be rejected.

An independent t test on the mean score difference between the NYHA Classes was carried out and revealed no significant difference (p=0.884) between the groups and the null hypothesis that there is no significant difference in self-care confidence between the NYHA classes can be accepted.

4.5.3.3: Age Group.

Mean self-care confidence scores indicate that the 40-69 year old age group have a pre intervention mean score of 48 ± 21 (range 17-90, CI 33-63) and a post intervention score of 71 ± 24 (range 45-128, CI 54-88). A Wilcoxon Signed Ranks test was performed to investigate any significant difference within the group and found that there is a significant difference (p=0.005) in self-care confidence post intervention and the null hypothesis that there is no significant improvement in self-care confidence in the 40-69 year old age group can be rejected.

Analysis of the self-care confidence data for the 60-69 year old age group show that the pre intervention mean score was 30 ± 18 (range 11-61, CI 18-42) and the post

intervention mean score was 53 ± 20 (range 17-90, CI 39-66). A Wilcoxon Signed Ranks test showed there is a statistically significant difference (p=0.003) and the null hypothesis that there is no significant improvement in self-care confidence in the 70-89 year old age group can be rejected.

Table 12 shows the results of a between groups analysis showing no significant difference (p=0.92) in self-care confidence between the age groups and the null hypothesis that there is no significant difference in self-care confidence between the age groups can be accepted.

Table 12. Between age group self-care confidence independent t test result

	Mean score difference	Standard Deviation ±	95% confidence interval	p Value Sig 2-tailed
40-69	23	10	16 to 31	
70-89	23	12	13 to 31	0.92

Chapter 5. Discussion.

5.1: Introduction.

The main aim of this evaluation was to assess the impact of the community based LWP for participants living in East Lancashire with a diagnosis of heart failure, on their quality of life, knowledge and self-care behaviour. The secondary aim was to assess the differences, if any, between genders, NYHA classes and age groups as previously defined.

5.2: Impact of the Living Well Programme on Quality of Life.

The quality of life results for all participants showed that there was a significant improvement in quality of life from baseline of 12% with a clinically significant score reduction of six points across all groups at the end of the six-week programme. These findings are consistent with those in Smeulder et al.'s (2010) RCT of a six-week DMP where there was also a significant improvement in quality of life immediately after the programme. Two other group programmes (Shively et al., 2005 & Yu et al., 2009) also found an improvement in quality of life in the short term. When breaking the data down into gender, age and NYHA class, there is also a significant improvement in quality of life for each of the variables.

5.2.1: Quality of Life and Gender.

Both males and females experienced a significant improvement in quality of life immediately after the LWP. The between groups analysis showed that females experienced a slightly greater improvement in quality of life (13%) than males (12%) but this was non significant. As the literature has previously shown (Gott et al., 2006, Hou et al., 2004, Riedinger et al., 2001 & Stromberg & Martensson, 2003) females appear to have worse quality of life than males. Even though the females in this service evaluation

reported worse quality of life than males, both before and after the programme, this was non-significant, echoing the findings of Riegel et al. (2003). As previously stated gender is very seldom analysed separately and there are proportionately less women represented in studies. Larger studies would be required to assess any true difference between genders.

5.2.2: Quality of Life and NYHA Classification.

Both NYHA class II (13%) and III (9%) showed significant and clinically meaningful improvement in quality of life from baseline. Class II's showed the greatest improvement in quality of life from baseline whilst class III's reported worse quality of life both before and after the programme however the difference between the classes was non-significant. These findings conclude that there even though there was a significant improvement for both NYHA class II and class III there was no significant difference in quality of life between the groups which does not appear to be consistent with the findings of Hobbs et al. (2002) and Juenger at al. (2002).

5.2.3: Quality of Life and Age.

Again both of the age groups experienced an improvement in quality of life from baseline, which was clinically significant by the end of the programme. The improvement was identical (13%) for both the younger and older groups, however the older age group reported slightly worse quality of life both pre and post programme than the younger age group and these findings are inconsistent with those of Seto et al.'s (2011) recent paper. The discrepancy in pre and post mean MLHFQ scores could be attributed to more general age related quality of life issues such as frailty (Buck & Riegel, 2011b & Gott et al., 2006) compounding the disease specific quality of life issues.

5.3: Impact of the Living Well Programme on Knowledge.

There was an overall significant improvement in knowledge of 100% from baseline. This improvement appears to be consistent with that found by Caldwell et al. (2005) and DeWalt et al. (2006) however these studies which have looked at knowledge as an outcome have had very small sample sizes, as with this service evaluation, and can only be looked at cautiously. More studies with much larger samples are required to be able to come to any definitive conclusion about impact on participant knowledge, which would be transferable to the population.

Significant improvements in knowledge were seen in both genders and in both NYHA classes with females reporting a slightly greater improvement of 133% as opposed to males at 100% and both NYHA classes improved by 100%. There is very little evidence in the literature to support these theories and further research would need to be carried out to provide any substance and further support the evidence provided by this service evaluation. PKQ scores for each of the groups were identical and no significant difference was found between either the genders or the NYHA classes. Again there is very little, if not non-existent, data to support or refute this argument. Findings from Artinian et al.'s (2002b) study would appear to be consistent with the gender data in this service evaluation however Ni et al. (1999) reported that women had significantly better knowledge than men. There has been no data found to support or refute any differences, or lack of, reported between NYHA classes.

When the data for age groups was analysed it was also found that there was a significant improvement in knowledge for both the younger (100%) and the older (133%) age groups. The older age group reported a lower score both pre and post programme compared to the younger category but they also reported a higher percentage improvement in knowledge however this was non-significant. Some evidence exists to suggest that younger patients (<75 years) have significantly better knowledge than older

patients (Artinian et al., 2002a & Ni et al., 1999). However there is very little other evidence to support or refute this and much larger studies would be required. The balance of the sample size of younger versus older participants in this service evaluation was almost identical and therefore bias to one category or the other cannot be cited as a reason for the outcome of the results. It has already been acknowledged that the sample size is very small and also a very basic tool was used to collect the information on knowledge and this may have affected the results. Provision of knowledge on it's own is not enough in encouraging and improving self-care (Ni et al., 1999 & Sneed & Paul, 2003) but as the data is only available pre and post programme it is impossible to evaluate the effectiveness of providing knowledge in this manner in the long term.

5.4: Impact of the Living Well Programme on Self-Care Behaviour.

There was an overall significant improvement in all three elements of self-care behaviour - maintenance (70%), management (66%) and confidence (63%). Riegel at al. (2009) stated that the minimum score for adequacy of self-care is 70 and according to this only the maintenance element of self-care came close to the required 'adequate' score at 68 and the management and confidence scores were a little way short – 53 and 62 respectively. One of the reasons for this may be that as the education element of the LWP improved participant knowledge the performance of self-care behaviour may have improved simply due to that increased knowledge. Confidence to perform self-care management behaviours (the second and third elements of self-care) may need to be built up over a period of time and this programme was relatively short in terms of maintained motivation and support. It should be remembered that even though each of the self-care behaviour categories fell short of the adequate score identified by Riegel et al. (2009) at the end of the programme with continued support these scores could continue to increase

and reach the adequate level. One of the aims of the programme was to improve self-care behaviour and the LWP appeared to have achieved this aim.

5.4.1: Gender Differences in Self-Care.

Both males and females reported significantly improved self-care behaviour from baseline for all elements of self-care. Males and females experienced an almost identical improvement in self-care maintenance – 35% and 37% respectively and their pre and post mean scores were also very similar. There were greater improvements in self-care management of 76% and 58% respectively. The males self-care management score was slightly higher both pre and post programme but this was non-significant. For self-care confidence the females experienced the greatest improvement of 79% as opposed to the male's improvement of 52%, however this again was a non-significant difference between the genders. These findings appear to agree with those of earlier studies (Artinian et al., 2002a, Eastwood et al., 2007, Holst et al., 2007, Jurgens et al., 2006a, Lupon et al., 2008, Ni et al., 1999 & Riegel et al., 2010a) that there is no difference in self-care behaviour between males and females. As previously mentioned there appears to be gender bias in recruitment to studies possibly affecting results. The gender distribution in this evaluation appears to mirror incidence of heart failure however the sample size is too small to be able to transfer this to a population level.

None of the mean scores for each of the self-care categories reached 'adequate' level for males or females however there was a significant improvement in all aspects of self-care for both genders of between 35% and 79%. Performance of self-care tasks and behaviours such as adherence to medication and regular weighing were almost identical for both genders whereas males had a slightly greater improvement in carrying out tasks in response to increased symptoms of heart failure such as take and extra water tablet or reduce fluid intake with slightly higher scores both pre and post programme. Females,

however, appeared to improve their confidence in their ability to self-care more than males but their scores were still lower than males both pre and post programme, however all these differences were non-significant. This disagrees with the recently published study by Dickson et al. (2011) in which females had higher self-care maintenance and management scores than males. Again, as always, sample sizes for this secondary study are relatively small and cannot be translated to the population. Gender differences in self-care may be due to the inherent gender differences that exist. The female role tends to be that of caregiver and can be guilty of neglecting their own care therefore given the opportunity to focus on themselves in a DMP may have an increase in their confidence in self-care. A possible reason for males having better overall scores is their ability to better interpret their symptoms as being related to heart failure and therefore perform behaviours to improve those symptoms (Riegel et al., 2010b).

5.4.2: NYHA Classification Differences in Self-Care.

Both NYHA class II and III participants reported significantly improved self-care across all three elements of the SCHFI but there was no significant difference between the groups. NYHA class II participants reported adequate mean self-care scores in both the maintenance and confidence behaviour scores post programme. Both classes had significant improvements in all three aspects of self-care behaviour but NYHA class II participants reported slightly higher scores both before and after the programme in each element. Even though their scores were lower for each element both pre and post programme, NYHA class III participants reported a greater improvement in both self-care management and confidence than NYHA class IIs but these differences were non-significant. NYHA class IIs only had a greater improvement in the maintenance element of self-care and this difference was negligible and also non-significant.

Self-care behaviour tends to improve in the short term across all NYHA classes as a result of an educational intervention (DeWalt et al., 2006, Jaarsma et al., 1999, Jaarsma et al., 2000, Smeulders et al., 2010 & Stromberg et al., 2003a) and the results of this service evaluation are consistent with those previous findings. Scores were lower across the board for NYHA class III participants and this apparently worse self-care behaviour for those with more symptoms is consistent with the findings of Lee et al. (2009) but other studies have reported that those with worse symptoms tend to perform self-care duties more than those with fewer symptoms as they may be more motivated to improve their symptoms (Rockwell & Riegel, 2001 & Seto et al., 2011) and those who are asymptomatic can to fail to self-care adequately until there is a worsening of symptoms (Riegel et al., 2011). However the results from this service evaluation are more consistent with Chriss et al. (2004), Carlson & Riegel (2004) and Suwanno et al. (2009) where the lower NYHA classes have better self-care. One possible explanation for this is that those participants in NYHA class III were older than those in NYHA class II and as such the age factor alongside functional class may also have had an influence on the slight differences seen between the two classes.

Even though the differences between NYHA class II and III participants were non-significant in all three elements of self-care there did appear to be a greater improvement in self-care maintenance behaviour and confidence amongst the NYHA class III participants in this evaluation. Significantly improved self-care confidence improves quality of life (Seto et al., 2011) and the NYHA class III participants in this evaluation showed the greatest improvement in any self-care category with a 100% increase in self-care confidence, which may well have contributed to the significant improvement in quality of life they also reported (Buck et al., 2011).

5.4.3: Age Differences in Self-Care.

Self-care behaviour for both the younger and older age groups significantly improved as a result of the LWP and this was across all the three elements. There was however no significant difference between the age groups in any of the elements of self-care. The younger participants achieved an adequate score post LWP for both self-care maintenance and for confidence and had the greatest, although non-significant, percentage improvement in self-care maintenance and self-care management but the greatest improvement in confidence was for the older age group. These results are not consistent with recent a suggestion that older people have better self-care (Seto et al., 2011) however as with so many of the studies relating to heart failure self-care behaviour the sample size was relatively small. The theory that younger participants are more symptom aware than older participants (Baas et al., 2004 & Jurgens et al., 2002) may be true in this case as the younger group reported better scores before and after the programme in all elements of self-care.

5.5: Limitations.

Recommendations for future research into improving quality of life, knowledge and self-care behaviour by means of DMPs should first of all address the limitations identified in this study. The first point would be to study a larger sample size to provide more statistical power to the results. Even though the differences found within each group showed statistical significance the between groups analysis found no statistically significant differences. With a larger sample size it would provide greater statistical power and may find differences between the categories identified in this evaluation.

As the data collected was self reported participants might have over or under exaggerated answers in order for to them to be socially acceptable responses to the questions and those responses may not be the most accurate. There may also be an

element of wanting to please the group leader by answering the questions in a favourable way. As this was a service evaluation of a pilot programme there was no control group in place and as such no comparisons can be made as to whether ordinary care would have the same or similar effects on quality of life, knowledge and self-care behaviour. Future research should ensure a control group is in place to provide more robust results.

The information available from the pilot programme did not include presence or otherwise of co-morbidities or medications for the participants. Even though physical activity was promoted during the programme there was also no formal collection of how much if any participants were undertaking and whether this would be at a level to have any effect on quality of life. Also home-based practice of the relaxation techniques was not formally monitored. Participants were simply encouraged to practice daily at each session, and so it is impossible to assess the impact of daily relaxation practice on quality of life and self-care confidence in participants. These factors may have an effect on the reported outcomes and should be considered in future research.

Finally, any future research should ensure a long term follow up period and should maybe also consider studying optimum programme length as they all differ. Six weeks was chosen for the initial programme as this timescale suited the programme leader both in terms of venue hire and also in terms of the material to be delivered. No data was collected beyond the six-week programme and it is therefore impossible to report on the long-term outcomes for this type of intervention.

5.6: Recommendations.

Future studies around the effectiveness of DMPs on quality of life, knowledge and self-care behaviour require larger samples, which are representative of the demographics of heart failure therefore giving results, which may be more easily translated into the wider population. A control group should also be in place to ensure robust results.

As intervention types vary so widely it may be prudent to look more closely at the differences, if any, between intervention types e.g. one to one educational intervention versus DMP. Some research around intervention types does exist however it is mainly studies with low sample sizes and poor design. More information should be sought as to the preferred location for intervention delivery. Much of the evidence to date is provided from clinical settings and does not acknowledge the important of providing care and continued support close to patients homes in community settings.

Finally, a longer follow up should be built in to future study designs to assess whether interventions are effective in the longer term or whether benefits are experienced solely during the lifetime of an intervention. Further research around optimum intervention length and exit strategy provision for ongoing support and motivation could also provide valuable information for future service design.

5.7: Conclusion.

Statistically significant improvements in quality of life, knowledge and self-care behaviour were seen in the participants of the Living Well Programme. The design of this programme of not only educating participants but also encouraging self-care behaviours with continued support and motivation would seem to be key in promoting behaviour change which in turn improves well being. The Living Well Programme was both time and cost effective to provide and appeared to provide social benefits for participants alongside those reported in this evaluation and feedback from participant's evaluations were that they were keen to attend a community venue.

On the basis of the evidence provided in this service evaluation East Lancashire Primary Care Trust should look to commission the Living Well Programme across East Lancashire as all heart failure patients in the area should have the opportunity to empower themselves to improve their health and well being.

References

Artinian, N.T., Magnan, M., Sloan, M. & Lange, M.P. (2002a). Self-care behaviours among patients with heart failure. *Heart and Lung. 31*(3) 161–172.

Artinian, N.T., Magnan, M., Christian, W. & Lange, M.P. (2002b). What do patients know about their heart failure? *Applied Nursing Research, 15*(4) 200-208.

Atienza, F., Anguita, M., Martinez-Alzamora, N., Osca, J., Ojeda, S., Almenar, L. followed by de Velasco, J.A. (2004). Multicentre randomised trial of a comprehensive hospital discharge and outpatient heart failure management programme. *European Journal of Heart Failure, 6*, 643-652.

Azevedo, A. (2008). Gender differences in heart failure. *Heart, 94*, 264-265.

Baas, L. S., Beery, T. A., Allen, G., Wizer, M. & Wagoner, L. E. (2004). An exploratory study of body awareness in persons with heart failure treated medically or with transplantation. *Journal of Cardiovascular Nursing, 19*(1) 32-40.

Bandura, A. (1997). Self-efficacy: The Exercise of Control. *Freeman, New York.*

Barlow, J., Wright, C., Sheasby, J., Turner, A. & Hainsworth, .J (2002). Self-management approaches for people with chronic conditions: a review. *Patient Education and Counseling, 48*(2) 177-187.

Bennett, S.J., Baker, S.L. & Huster, G.A. (1998). Quality of life in women with heart failure. *Health Care for Women International, 19*(3) 217-229.

Buck, H.G., Lee, C.S., Moser, D.K., Albert, N.M., Lennie, T., Bentley, B. followed by Riegel, B. (2011a). Relationship between self-care and health-related quality of life in older adults with moderate to advanced heart failure. *Journal of Cardiovascular Nursing,* DOI 10.1097/JCN.0b013e3182106299

Buck, H.G. & Riegel, B (2011b). The impact of frailty on health related quality of life in heart failure. *European Journal of Cardiovascular Nursing, 10*(3) 159-166.

Caldwell, M.A., Peters, K.J. & Dracup, K.A. (2005). A simplified education program improves knowledge, self-care behaviour, and disease severity in heart failure patients in rural settings. *American Heart Journal, 150*(5) 983.

Cameron, O. G. (2001). Interoception: the inside story—a model for psychosomatic processes. *Psychosomatic Medicine, 63*, 697-710.

Cameron, J., Worrall-Carter, L., Page, K., Riegel, B., Kai Lo, S. & Stewart, S (2010). Does cognitive impairment predict poor self-care in patients with heart failure? *European Journal of Heart Failure, 12*(5) 508-515.

Chin, M.H. & Goldman, L. (1998). Gender differences in 1-year survival and quality of life among patients admitted with congestive heart failure. *Medical Care, 36*(7) 1033-1046.

Chriss, P.M., Sherposh, J., Carlson, B., Riegel, B. (2004). Predictors of successful heart failure self-care maintenance in the first three months after hospitalisation. *Heart Lung, 33*(6) 345-353.

Cleland, J.G.F., Swedberg, K., Follath, F., Komajda, M., Cohen-Solal, A., Aguilar, J.C., followed by Mason, J. (2003). The EuroHeart Failure survey programme—a survey on the quality of care among patients with heart failure in Europe Part 1: patient characteristics and diagnosis. *European Heart Journal, 24*(5) 442-463.

Cline, C.M., Israelsson, B.Y., Willenheimer, R.B., Broms, K. & Erhardt, L.R. (1998). Cost effective management programme for heart failure reduces hospitalisation. *Heart, 80,* 442-446.

Coakes, S.J., & Steed, L.G., (2003). SPSS without anguish. *Queensland: John Wiley*

Coulter, A & Ellins, J. (2006). Patient focused interventions: A review of the evidence. Picker Institute Europe, *The Health Foundation, London.*

Cowie, M.R, Wood, D.A., Coats, A.J.S, Thompson, S.G., Poole-Wilson, P.A., Suresh, V. & Sutton, G.C. (1999). Incidence and aetiology of heart failure: A population-based study. *European Heart Journal 20,* 421-428.

Cowie, M.R, Wood, D.A., Coats, A.J.S, Thompson, S.G., Suresh, V., Poole-Wilson, P.A. & Sutton, G.C. (2000). Survival of patients with a new diagnosis of heart failure: a population based study. *Heart, 83,* 505-510.

Dale, E. (1969). Audiovisual methods in teaching, third edition. *New York: The Dryden Press, Holt Rineheart and Winston.*

Davies, M.K., Hobbs, F.D.R., Davis, R.C., Kenkre, J.E., Roalfe, A.K., Hare, R., followed by Lancashire, R.J. (2001). Prevalence of left ventricular systolic dysfunction and heart failure in the Echocardiographic Heart of England Screening study: a population based study. *Lancet, 358*(9280), 439-444.

Del Sindaco, D., Pulignano, G., Minardi, G., Apostoli, A., Guerrieri, L., Rotoloni, M., followed by Leggio, F. (2007). Two-year outcome of a prospective, controlled study of a disease management programme for elderly patients with heart failure. *Journal of Cardiovascular Medicine, 8*(5), 324-329.

Department of Health (2000a). National Service Framework for Coronary Heart Disease. Modern Standards and Service Models. *The Stationary Office, London.*

Department of Health (2000b). The NHS Plan: a plan for investment, a plan for reform. *The Stationary Office, London.*

Department of Health (2001). The Expert Patient: A new approach to chronic disease management for the 21st century. *The Stationary Office, London.*

Department of Health (2005). Supporting People with Long Term Conditions. An NHS and Social Care Model to support local innovation and integration. *The Stationary Office, London.*

Department of Health (2006). Supporting people with long-term conditions to self-care: A guide to developing local strategies and practices. *The Stationary Office, London.*

Department of Health (2008). Delivering care closer to home: Meeting the challenge. *The Stationary Office, London.*

DeWalt, D.A., Malone, R., Bryant, M.E., Kosnar, M.C., Corr, K.E., Rothman, followed by Pignone, M.P. (2006). A heart failure self-management program for patients of all literacy levels: A randomized, controlled trial. *BMC Health Services Research, 6,* 30.

Dickson, V.V., Deatrick, J.A., Goldberg, L.R. & Riegel, B. (2006). A mixed methods study exploring the factors that facilitate and impede heart failure self care. *Journal of Cardiac Failure, 12*(6) S1, S124-S125.

Dickson, V.V., Worrall-Carter, L., Kuhn, L & Riegel, B. (2011). Whose job is it? Gender differences in perceived role in heart failure self-care. *Journal of Nursing and Health Care of Chronic Illness, 3*, 99-108.

Dickstein, K., Cohen-Solal, A., Filippatos, G., McMurray, J.J., Ponikowski, P., Poole-Wilson, P.A., followed by Swedberg, K. (2008). ESC guidelines for the diagnosis and treatment of acute and chronic heart failure. *European Journal of Heart Failure, 10*, 933–989.

Ditewig, J.B., Blok, H., Havers, J. & van Veenendaal, H. (2010). Effectiveness of self-management interventions on mortality, hospital readmissions, chronic heart failure hospitalisation rate and quality of life in patients with chronic heart failure: A systematic review. *Patient Education and Counselling, 78*, 297-315.

van Dixhoorn, J.J., & White, A. (2005). Relaxation therapy for rehabilitation and prevention in ischaemic heart disease: a systematic review and meta-analysis. *European Journal of Cardiovascular Prevention & Rehabilitation, 12*(3) 193-202.

Eastwood, C.A., Travis, L., Morgenstern, T.T. & Donaho, E.K. (2007). Weight and symptom diary for self-monitoring in heart failure clinic patients. *Journal of Cardiovascular Nursing, 22*(5) 382–389.

Gott, M., Barnes, S., Parker, C., Payne, S., Seamark, D., Gariballa, S. & Small, N. (2006). Predictors of the quality of life of older people with heart failure recruited from primary care. *Age and Ageing, 35*, 172-177.

Grady, K. (2008). Self-care and quality of life outcomes in heart failure patients. *Journal of Cardiovascular Nursing, 23*(3) 285-292.

Green C.P., Porter C.B., Bresnahan D.R. & Spertus J.A. (2000). Development and evaluation of the Kansas City Cardiomyopathy Questionnaire: a new health status measure for heart failure. *Journal of the American College of Cardiology, 35(*5*),* 1245–1255.

Hays R.D., Sherbourne C.D. & Mazel R.M. (1993). The RAND 36-Item Health Survey 1.0. *Health Economics, 2*, 217–227.

Herschberger, R.E., Ni, H, Nauman, D.J., Burgess, D., Toy, W., Wise followed by M., Everett, J (2001). Prospective evaluation of an outpatient heart failure management programme. *Journal of Cardiac Failure, 7*(1) 64-74.

Ho, K.K., Pinsky, J.L., Kannel, W.B. & Levy, D. (1993a). The epidemiology of heart failure: the Framingham study. *Journal of the American College of Cardiology 22*(4 Suppl A), 6A-13A.

Ho, K.K., Anderson, K.M., Kannel, W.B., Groossman, W. & Levy, D. (1993b). Survival after the onset of congestive cardiac failure in Framingham Heart study subjects. *Circulation, 88*,107–115.

Hobbs, F.D.R., Kenkre, J.E., Roalfe, A.K., Davis, R.C., Hare, R. & Davies, M.K. (2002). Impact of heart failure and left ventricular systolic dysfunction on quality of life: a

cross-sectional study comparing common chronic cardiac and medical disorders and a representative adult population. *European Heart Journal, 23*, 1867-1876.

Hobbs, F.D.R., Roalfe, A.K., Davis, R.C., Davies, R.C. & Hare, R. (2007). Prognosis of all-cause heart failure and borderline left ventricular systolic dysfunction: 5 year mortality follow-up of the Echocardiographic Heart of England Screening Study (ECHOES). *European Heart Journal, 28*(9), 1128-1134.

Holst, M., Willenheimer, R., Martensson, J., Lindholm, M. & Stromberg, A. (2007). Telephone follow-up of self care behaviour after a single session of education of patients with heart failure in primary health care. *European Journal of Cardiovascular Nursing, 6*, 153-159.

Hou, N., Chui, M.A., Eckert, G.J., Oldridge, N.B., Murray, M.D. & Bennett, S.J. (2004). Relationship of age and sex to health-related quality of life in patients with heart failure. *American Journal of Critical Care, 13*, 153-161.

Jaarsma, T., Halfens, R., Abu-Saad, H.H., Dracup, K., Gorgels, T., van Ree, J. & Stappers, J. (1999). Effects of education and support on self-care and resource utilisation in patients with heart failure. *European Heart Journal 20*, 673-682.

Jaarsma, T., Halfens R., Tan F., Abu-Saad H.H., Dracup K & Diederiks J. (2000). Self-care and quality of life in patients with advanced heart failure: the effect of a supportive educational intervention. *Heart Lung, 29*(5), 319-330.

Jaarsma T., Stromberg A., Martensson J. & Dracup K. (2003). Development and testing of the European Heart Failure Self-Care Behaviour Scale. *European Journal of Heart Failure, 5(*3*),* 363–370.

Juenger, J., Schellberg, D., Kraemar, S., Haunstetter, A., Zugck, C., Herzog, W. & Haass, M. (2002). Health related quality of life in patients with congestive heart failure: comparison with other chronic diseases and relation to functional variables. *Heart, 87*(3) 235-241.

Jurgens, C.Y., Fain, J.A. & Riegel, B. (2006a). Psychometric testing of the heart failure somatic awareness scale. *Journal of Cardiovascular Nursing,* 21(2) 95–102.

Jurgens, C. Y. (2006b). Somatic awareness, uncertainty, and delay in care-seeking in acute heart failure. *Research in Nursing &.Health, 29*(2), 74-86.

Kendall E., Catalano T., Kuipers P., Posner N., Buys N &, Charker J. (2007). Recovery following stroke: the role of self-management education. *Social Science & Medicine, 64(*3*),* 735–746.

Kennedy, A., Reeves, D., Bower, P., Lee, V., Middleton, E., Richardson, G. followed by Rogers A. (2007). The effectiveness and cost effectiveness of a national lay-led self care support programme for patients with long-term conditions: a pragmatic randomised controlled trial.. *Journal of Epidemiology and Community Health, 61(*3*),* 254–261.

Koelling, T.M., Johnson, M.L., Cody, R.J. & Aaronson, K.D. (2005). Discharge education improves clinical outcomes in patients with chronic heart failure. *Circulation, 111,* 179-185.

Kostis, J.B., Rosen, R.C., Cosgrove, N.M., Shindler, D.M. & Wilson, A.C. (1994). Nonpharmacologic therapy improves functional and emotional status in congestive heart failure. *Chest, 106*(4) 996-1001.

Krumholz, H.M., Amatruda, J., Smith, G.L., Mattera, J.A., Roumanis, S.A., Radford, M.J. followed by Vaccarino, V. (2002). Randomized trial of an education and support intervention to prevent readmission of patients with heart failure. *Journal of American College of Cardiology, 39*(1), 83-89.

Lainscak, M. & Keber, I. (2005). Validation of self-assessment patient knowledge questionnaire for heart failure patients. *European Journal of Cardiovascular Nursing, 4*(4) 269-272.

Lainscak, M., Cleland, J.G.F., Lenzen, M.J., Nabb, S., Keber, I., Follath, F. followed by Swedberg, K. (2007). Recall of lifestyle advice in patients recently hospitalised with heart failure: A EuroHeart Failure Survey analysis. *European Journal of Heart Failure, 9*(11) 1095-1103.

Lee, C.S., Riegel, B., Driscoll, A., Suwanno, J., Moser, D.K., Lennie, T.A. followed by Worrall-Carter, L. (2009). Gender differences in heart failure self-care: A multinational cross-sectional study. *International Journal of Nursing Studies, 46*(11) 1485-1495.

Lorig, K.R., Sobel, D.S., Stewart, A.L., Brown, B.W. Jr, Bandura, A., Ritter, P. followed by Holman, H.R. (1999). Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Medical Care, 37(*1*),* 5–14.

Lupon, J., Gonzalez, B., Mas, D., Urrutia, A., Arenas M., Domingo, M. followed by Valle, V. (2008). Patients' self-care improvement with nurse education intervention in Spain assessed by the European Heart Failure Self-Care Behaviour Scale. *European Journal of Cardiovascular Nursing, 7*(1) 16–20.

Luskin, F., Reitz, M., Newell, K., Quinn, T.G. & Haskell, W. (2002). A controlled pilot study of stress management training of elderly patients with congestive heart failure. *Preventative Cardiology, 5*(4) 168-174.

Mehta, P.A., Dubrey, S.W., McIntyre, H.F., Walker, D.M., Hardman, S.M.C., Sutton, G.C., followed by Cowie, M.R (2009). Improving survival in the 6 months after diagnosis of heart failure in the past decade: population-based data from the UK. *Heart, 95*, 1851-1856.

Moser, D.K., Dracup, K., Woo, M.A & Stevenson, L.W. (1997). Voluntary control of vascular tone by using skin-temperature biofeedback-relaxation in patients with advanced heart failure. *Alternative Therapy in Health Medicine, 3*(1) 51-59.

National Institute for Health and Clinical Excellence (2010). Chronic heart failure: management of chronic heart failure in adults in primary and secondary care, Guideline 108. *National Institute for Health and Clinical Excellence, London.*

NHS Improvement (2008). Heart Failure: A quick guide to quality commissioning across the whole pathway of care. *NHS Improvement, Leicester.*

Ni, H., Nauman, D., Burgess, D., Wise, K., Crispell, K. & Hershberger, R.E. (1999). Factors influencing knowledge of and adherence to self-care amongst patients with heart failure. *Archives of Internal Medicine, 159,* 1613-1619.

Peterson, S., Rayner, M. & Wolsteholme, J. (2002). Coronary Heart Disease Statistics: heart failure supplement. *British Heart Foundation, London.*

Peveler, R.C., & Johnston, D.W. (1986). Subjective and cognitive effects of relaxation. *Behaviour Research and Therapy, 24*(4) 413-420.

Rector, T.S., Kubo, S.H. & Cohn, J.N. (1987). Patients' self-assessment of their congestive heart failure. Part 2 Content, reliability and validity of a new measure, the Minnesota Living with Heart Failure questionnaire. *Heart Failure, Oct/Nov* 198-209.

Rector, T.S. (2005). Overview of the Minnesota Living with Heart Failure questionnaire. https://docs.google.com/a/umn.edu/viewer?a=v&pid=sites&srcid=dW1uLmVkdXx0bXN8Z3g6MjQxYWMzOTBkMWYwMjAwZA downloaded August, 28th, 2011

Riedinger, M.S., Dracup, K.A., Brecht, M-L., Padilla, G., Sarna, L for the SOLVD Investigators & Ganz, P.A. (2001). Quality of life in patients with heart failure: Do gender differences exist? *Heart & Lung: The Journal of Acute and Critical Care, 30*(2) 105-116.

Riegel, B., & Carlson, B (2002). Facilitators and barriers to heart failure self care. *Patient Education and Counseling, 46,* 287-295.

Riegel, B., Moser, D.K., Carlson, B., Deaton, C., Armola, R., Sethares, K. followed by Albert, N. (2003). Gender differences in quality of life are minimal in patients with heart failure. *Journal of Cardiac Failure, 9*(1) 42-48.

Riegel, B., Lee, C, Dickson, V.V. & Carlson, B. (2009). An Update on the Self-Care of Heart Failure Index. *Journal of Cardiovascular Nursing, 26*(6) 485-497.

Riegel, B., Dickson, V.V., Kuhn, L., Page, K. & Worrall-Carter, L. (2010a). Gender-specific barriers and facilitators to heart failure self-care: a mixed methods study. *International Journal of Nursing Studies, 47*(7) 888-895.

Riegel, B., Dickson, V.V., Cameron, J., Johnson, J.C., Bunker, S., Page, K. & Worrall-Carter, L (2010b). Symptom recognition in elders with heart failure. J*ournal of Nursing Scholarship, 42*(1) 92-100.

Riegel, B., Lee, C.S., Albert, N, Lennie, T., Chung, M., Song, E.K followed by Moser, D.K. (2011). From novice to expert: confidence and activity status determine heart failure self-care performance. *Nursing Research, 60*(2) 132-138.

Rockwell, J.M. & Riegel, B. (2001). Predictors of self-care in persons with heart failure. *Heart & Lung: The Journal of Acute & Critical Care, 30,* 18-25.

Samuel, R.S., Hausdorff, J.M. & Wei, J.Y. (1999). Congestive heart failure with preserved systolic function is it a women's disease? *Women's Health Issues, 9*(4) 219-222.

Seto, E., Leonard, K. J., Cafazzo, J.A., Masino, C., Barnsley, J. & Ross, H. (2011). Self-care and quality of life of heart failure patients at a multidisciplinary heart function clinic. *Journal of Cardiovascular Nursing, 26*(5) 377-385.

Shively, M., Kodiath, M., Smith, T.L., Kelly, A., Bone, P., Fetterly, L followed by Dracup, K. (2005). Effect of behavioral management on quality of life in mild heart failure: a randomized controlled trial. *Patient Education and Counselling, 58*(1) 27–34.

Smeulders, E.S.T.F., Van Hasstregt, J.C.M., Ambergen, T., Uszko-Lencer, N.H.K.M., Janssen-Boyne, J.J.J., Gorgels, A.P.M. followed by Van Eijk, J.T.H.M, (2010). Nurse-led self management group programme for patients with congestive heart failure: randomised controlled trial. *Journal of Advanced Nursing, 66*(7) 1487-1499.

Sneed, N.V. & Paul, S.C. (2003). Readiness for behavioural changes in patients with heart failure. *American Journal of Critical Care, 12,* 444-453.

Stromberg, A., Martensson, J., Fridlund, B., Levin, L-A., Karlsson, J-E. & Dahlstrom, U. (2003a). Nurse-led heart failure clinics improve survival and self-care behaviour in patients with heart failure: results from a prospective, randomised trial. *European Heart Journal, 24,* 1014-1023.

Stromberg, A. & Martensson, J. (2003b). Gender differences in patients with heart failure. *European Journal of Cardiovascular Nursing, 2,* 7-18.

Sullivan, M.J., Wood, L., Terry, J., Brantley, J., Charles, A., McGee, V. followed by Cuffe, M.S. (2009). The Support, Education and Research in Chronic Heart Failure Study (SEARCH): A mindfulness-based psychoeducational intervention improves depression and clinical symptoms in patients with chronic heart failure. *American Heart Journal, 157,* 84-90.

Suwanno, J., Petpichetchian, W., Riegel, B & Issaramalai, S.A. (2009). A model predicting health status of patients with heart failure. *Journal of Cardiovascular Nursing, 24*(2) 118-126.

Vogels, R.L., Scheltens, P, Schroeder-Tanker, J.M. & Weinstein, H.C. (2007.) Cognitive impairment in heart failure: a systematic review of the literature. *European Journal of Heart Failure, 9,* 440-449.

Ware E., Jr., Kosinski, M., Bayliss, M.S., McHorney, C.A., Rogers, W.H. & Raczek, A. (1995). Comparison of methods for the scoring and statistical analysis of SF-36

health profile and summary measures: summary of results from the Medical Outcomes Study, *Medical Care, 33*(4) AS264–AS279.

Yu, D.S.F., Thompson, D.R. & Lee, D.T.F. (2006). Disease management programmes for older people with heart failure: crucial characteristics which improve post-discharge outcomes. *European Heart Journal, 27,* 596-612.

Yu, D.S.F., Lee, D.T.F. & Woo, J. (2009). Improving health-related quality of life of patients with chronic heart failure: effects of relaxation therapy. *Journal of Advanced Nursing, 66*(2) 392-403.

Zambroski, C.H., Moser, D.K., Bhat, G. & Zeigler, C. (2005). Impact of symptom prevalence and symptom burden on quality of life in patients with heart failure. *European Journal of Cardiovascular Nursing, 4*(3) 196-206.

APPENDIX A

University of Chester

Faculty of Applied Sciences
Research Ethics Committee

Tel 01244 511740
Fax 01244 511302
frec@chester.ac.uk

11th July 2011

Dear Clare,

Study title: **Evaluation of a pilot community based heart failure self care & relaxation programme in East Lancashire and its impact on the well being and self care confidence of participants**
FREC reference: **530/11/CB/CS**
Version number: **1**

Thank you for sending your application to the Faculty of Applied Sciences Research Ethics Committee for review.

I am pleased to confirm ethical approval for the above research, provided that you comply with the conditions set out in the attached document, and adhere to the processes described in your application form and supporting documentation.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application Form	1	April 2011
Appendix 1 – List of References	1	April 2011
Appendix 2 – C.V. for Lead Researcher	1	April 2011

Appendix 3 – Written permission to use data	1	April 2011
Appendix 4 – Living Well Programme Questionnaire	1	April 2011
Appendix 5 – Written Permission – East Lancashire Heart Failure Nursing Service – Heart Failure Clinical Lead	1	April 2011
Appendix 6 – Confirmation REC review is not required	1	April 2011
Appendix 7 – Living Well Programme Design	1	April 2011
Response to FREC request for further information and clarification		June 2011
Appendix 9 – Patient Knowledge Questionnaire	1	June 2011
Appendix 10 – Minnesota Living with Heart Failure Questionnaire	1	June 2011
Appendix 11 – Self-Care of Heart Failure Index	1	June 2011
Appendix 12 – Living Well Programme – Informed Consent	1	June 2011

With the Committee's best wishes for the success of this project.

Yours sincerely,

Simon Alford
Chair, Faculty Research Ethics Committee

Enclosures Standard conditions of approval.

C.c. Supervisor
FREC Representative

APPENDIX B

Living Well Programme
Informed Consent

I understand that the information given during the course of this programme may be used for the purpose of service evaluation.

I also understand that I can withdraw my information at any time by contact my tutor on

Signed .....

Date .....

APPENDIX C

Healthy Lifestyles

St Peter's Health Centre

Church Street

Burnley

BB11 2DL

Dear

You are invited to attend the new Living Well with Heart Failure Self Care Programme. The programme is an education and relaxation programme designed to help you learn how to manage your condition to prevent you having to go into hospital and have a better quality of life. A friend or a member of your family who may be involved in your care is also more than welcome to attend.

The programme is starting **Tuesday 5th April, 2010 at 6pm until 7.30pm and will last for six weeks.**

The sessions will take place at **St Peter's Centre, Church Street, Burnley, BB11 2DL.**

The programme will be led by Beth Baron, Cardiac Rehabilitation Practitioner for Burnley and will also include a session on medicines led by Angela Graves, Heart Failure Specialist Nurse. Topics will include:

- Fluid Management & Monitoring
- Eating Well
- Physical Activity
- What Your Medicine Does
- Managing Stress & Anxiety
- Weekly Relaxation Session including breathing exercises and seated yoga

There will also be time for a cup of tea or coffee and socialising.

If you would like to discuss the programme in more detail and book a place on the programme for you and your carer please call Beth on healthylifestyles@burnley.gov.uk

Yours truly

Beth Baron

Cardiac Rehabilitation Practitioner

APPENDIX D

Living Well Programme Structure

Week	Education	Relaxation
1	What is Heart Failure? Medications for Heart Failure – led by HFSN	Managing Breathlessness and Introduction
2	Fluid Management Weighing Yourself	Practising Breathing Techniques
3	Keeping Active Home Activity vs Structured Activity	Reducing Muscular Tension with Progressive Relaxation
4	Healthy Eating with the Eat Well Plate	Seated Tai Chi & Qigong Breathing
5	Stress Management & Coping Techniques	Seated Yoga
6	Expert Patient & Expert Carer Visit	Guided Relaxation Technique

APPENDIX E

BHF Publications used during the Living Well Programme

An Everyday Guide to Living with Heart Failure

Personal Record Card

Cut Down on Salt

Salt Made Simple

Put Your Heart into Walking

Eating Well

Coping With Stress

APPENDIX F

MINNESOTA LIVING WITH HEART FAILURE© QUESTIONNAIRE

APPENDIX G

SELF-CARE OF HEART FAILURE INDEX

All answers are confidential.

Think about how you have been feeling in the last month or since we last spoke as you complete these items.

SECTION A:

Listed below are common instructions given to persons with heart failure. How routinely do you do the following?

	Never or rarely	Sometimes	Frequently	Always or daily
1. Weigh yourself?	1	2	3	4
2. Check your ankles for swelling?	1	2	3	4
3. Try to avoid getting sick (e.g., flu shot, avoid ill people)?	1	2	3	4
4. Do some physical activity?	1	2	3	4
5. Keep doctor or nurse appointments?	1	2	3	4
6. Eat a low salt diet?	1	2	3	4
7. Exercise for 30 minutes?	1	2	3	4
8. Forget to take one of your medicines?	1	2	3	4
9. Ask for low salt items when eating out or visiting others?	1	2	3	4
10. Use a system (pill box, reminders) to help you remember your medicines?	1	2	3	4

SECTION B:

Many patients have symptoms due to their heart failure. <u>Trouble breathing and ankle swelling</u> are common symptoms of heart failure.

In the past month, have you had trouble breathing or ankle swelling? Circle <u>one</u>.

0) No

1) Yes

11. If you had trouble breathing or ankle swelling in the past month…

(circle **one** number)

	Have not had these	**I did not recognize it**	**Not Quickly**	**Somewhat Quickly**	**Quickly**	**Very Quickly**
How quickly did you recognize it as a symptom of heart failure?	N/A	0	1	2	3	4

Listed below are remedies that people with heart failure use. If you have trouble breathing or ankle swelling, how likely are you to try one of these remedies?

(circle **one** number for each remedy)

	Not Likely	**Somewhat Likely**	**Likely**	**Very Likely**
12. Reduce the salt in your diet	1	2	3	4
13. Reduce your fluid intake	1	2	3	4
14. Take an extra water pill	1	2	3	4
15. Call your doctor or nurse for guidance	1	2	3	4

16. Think of a remedy you tried the last time you had trouble breathing or ankle swelling,

(circle **one** number)

	I did not try anything	**Not Sure**	**Somewhat Sure**	**Sure**	**Very Sure**
How sure were you that the remedy helped or did not help?	0	1	2	3	4

SECTION C:

In general, how confident are you that you can:

	Not Confident	Somewhat Confident	Very Confident	Extremely Confident
17. Keep yourself free of heart failure symptoms?	1	2	3	4
18. Follow the treatment advice you have been given?	1	2	3	4
19. Evaluate the importance of your symptoms?	1	2	3	4
20. Recognize changes in your health if they occur?	1	2	3	4
21. Do something that will relieve your symptoms?	1	2	3	4
22. Evaluate how well a remedy works?	1	2	3	4

.

APPENDIX H

Patent Heart Failure Knowledge Questionnaire

Lainscak & Keber (2005)

APPENDIX I

LIVING WELL PROGRAMME QUESTIONNAIRE

Name: ……..

Address: …….

Telephone No. …… Post Code ……..……

Date of birth ……

1. Were you satisfied with the explanation given to you about the programme at the time of booking? Yes / No
If no, how do you feel this could have been improved?
…….

……..……

2. Did attending the programme present you with any other problems?
For example, arranging transport? Yes / No

If yes – please specify……..

3. What benefits do you feel you have gained from attending the programme? Please tick all those that apply.

- ☐ I feel more relaxed
- ☐ I am coping better with my heart failure
- ☐ I am more active
- ☐ I am more confident in how to deal with my symptoms
- ☐ I am sleeping better
- ☐ I understand my medication better
- ☐ I have lost weight
- ☐ I am eating less salt
- ☐ Other …… … … … … … … … … …

4. Which part of the programme was most useful for you?
……

……

……

5. Was there anything that you did not find useful?

……

……

6. Was there anything else that you feel should be included to improve the programme?

……

……

7. Do you feel you need any further support in making or maintaining changes to your lifestyle? E.g. stopping smoking, further dietary changes, further weight loss/gain.

If yes, please specify what you would like support with

……..……..

……

Rating the scheme

9. How satisfied are you with the programme?

E – Excellent G – Good F – Fair P – Poor

Venue

Improved well being/mental health

Tutor knowledge & support

Content of class

Social benefits

Please use the space below for any comments you have about the programme or any other aspect of your care.

……

……

Thank you for completing this questionnaire.
The information you provide may be used in planning future service provision. If you are happy for your data to be used for such purposes please sign below N.B. all personal information will be removed from any data used for evaluation purposes

Signed **Date**

APPENDIX J

New York Heart Association Functional Classification

New York Heart Association (NYHA) classification is used to grade the severity of functional limitations in a patient with heart failure.

It places patients in one of four categories based on how much they are limited during physical activity; the limitations/symptoms are in regards to normal breathing and varying degrees in shortness of breath and or angina pain:

- **class I** no limitation of physical activity - asymptomatic
  - ordinary physical activity does not cause fatigue, breathlessness or palpitations
- **class II** slight limitation of physical activity – 'mild' heart failure
  - patients are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, breathlessness or angina
- **class III** marked limitation of physical activity – 'moderate' heart failure
  - although patients are comfortable at rest, less than ordinary activity will lead to symptoms
- **class IV** inability to carry out any physical activity without discomfort – 'severe' heart failure
  - symptoms of congestive cardiac failure are present even at rest. Increased discomfort with any physical activity

APPENDIX K

Raw Data from SPSS Data Collection

Minnesota Living with Heart Failure Questionnaire Scores

Participant	**Pre Score**	**Post Score**	Difference
1	64	51	**7**
2	47	41	**6**
3	22	19	**3**
4	18	14	**4**
5	58	48	**10**
6	68	56	**12**
7	41	40	**1**
8	53	48	**5**
9	45	39	**6**
10	67	61	**6**
11	49	45	**4**
12	24	22	**2**
13	58	51	**7**
14	25	22	**3**
15	55	47	**8**
16	59	53	**6**
17	49	44	**5**
18	54	46	**8**
19	71	63	**8**
20	84	78	**6**
21	53	50	**3**

Knowledge Questionnaire Scores

Participant	**Pre Score**	**Post Score**	Difference
1	3	7	**4**
2	6	9	**3**
3	4	7	**3**
4	5	10	**5**
5	6	9	**3**
6	4	7	**3**
7	5	9	**4**
8	3	8	**5**
9	3	8	**5**
10	3	6	**3**
11	4	9	**5**
12	4	8	**4**
13	4	9	**5**
14	4	8	**4**
15	5	7	**2**
16	2	7	**5**
17	4	7	**3**
18	2	6	**4**
19	3	5	**2**
20	2	6	**4**
21	3	6	**3**

Index of Self Care Behaviour Scores

Self Care Maintenance Category

Participant	**Pre Score**	**Post Score**	Difference
1	47	83	**36**
2	57	80	**23**
3	60	83	**23**
4	43	60	**23**
5	70	80	**10**
6	57	63	**6**
7	57	80	**23**
8	33	67	**34**
9	40	63	**23**
10	40	47	**7**
11	40	67	**27**
12	60	67	**7**
13	60	80	**20**
14	57	67	**10**
15	43	47	**4**
16	43	67	**24**
17	40	60	**20**
18	57	73	**17**
19	47	60	**13**
20	43	47	**4**
21	33	83	**50**

Self Care Management Category

Participant	**Pre Score**	**Post Score**	Difference
1	30	60	**30**
2	30	65	**35**
3	25	50	**25**
4	50	75	**25**
5	60	60	**-**
6	30	50	**20**
7	35	60	**25**
8	20	55	**35**
9	20	35	**15**
10	15	50	**35**
11	55	75	**25**
12	55	65	**10**
13	30	55	**25**
14	35	55	**20**
15	30	50	**20**
16	25	50	**25**
17	25	40	**15**
18	35	55	**20**
19	25	30	**25**
20	25	40	**15**
21	20	45	**25**

Self Care Confidence Category

Participant	**Pre Score**	**Post Score**	Difference
1	17	45	**28**
2	61	72	**11**
3	50	67	**17**
4	56	90	**34**
5	61	67	**6**
6	90	128	**38**
7	45	67	**22**
8	45	72	**27**
9	22	45	**23**
10	33	61	**28**
11	61	90	**29**
12	61	67	**6**
13	33	67	**34**
14	33	61	**28**
15	33	45	**12**
16	33	61	**28**
17	17	61	**44**
18	17	33	**17**
19	17	45	**28**
20	11	33	**22**
21	11	17	**6**

APPENDIX L

Minnesota Living with Heart Failure Questionnaire Data

Pre & Post Intervention Test for Normality & Paired Samples Data

		Shapiro-Wilk Sig.	Paired Samples t-test Sig. (2-tailed)	Wilcoxon Signed Ranks test Asymp. Sig. (2-tailed)	Mean Score	Standard Deviation ±	95% Confidence Interval Lower Limit	Upper Limit
All Participants	Pre	0.30	0.005		51	17	43	58
	Post	0.21			45	15	38	52
Males	Pre	0.45	0.005		49	21	37	61
	Post	0.65			43	19	33	54
Females	Pre	0.36	0.005		54	5	49	59
	Post	0.83			47	5	43	52
NYHA II	Pre	0.31	0.005		46	17	35	56
	Post	0.07			40	14	31	48
NYHA III	Pre	0.68	0.005		57	16	45	70
	Post	0.75			52	15	40	63
40-69	Pre	0.20	0.005		48	18	56	61
	Post	0.26			42	15	31	52
70-89	Pre	0.301	0.005		53	17	41	64
	Post	0.255			47	16	37	58

Patient Knowledge Questionnaire Data

Pre & Post Intervention Test for Normality & Paired Samples Data

		Shapiro-Wilk Sig.	Paired Samples t-test Sig. (2-tailed)	Wilcoxon Signed Ranks test Asymp. Sig. (2-tailed)	Mean Score	Standard Deviation ±	95% Confidence Interval Lower Limit	Upper Limit
All	Pre	0.85	0.005		4	1	3	4
	Post	0.206			8	1	7	8
Males	Pre	0.38	0.005		4	1	2	6
	Post	0.72			8	1	5	10
Females	Pre	0.31	0.005		3	1	2	6
	Post	0.22			7	1	6	10
NYHA II	Pre	0.07	0.005		4	1	3	6
	Post	0.08			8	1	7	10
NYHA III	Pre	0.19	0.005		3	1	2	5
	Post	0.34			6	1	5	8
40-69	Pre	0.46	0.005		4	1	3	5
	Post	0.55			8	1	7	9
70-89	Pre	0.054	0.005		3	1	3	4
	Post	0.448			7	1	6	8

Self Care Heart Failure Index Questionnaire Data

Pre & Post Intervention Test for Normality & Paired Samples Data

Self Care Maintenance Behaviour Scores		Shapiro-Wilk Sig.	Paired Samples t-test Sig. (2-tailed)	Wilcoxon Signed Ranks test Asymp. Sig. (2-tailed)	Mean Score	Standard Deviation ±	95% Confidence Interval Lower Limit	Upper Limit
All Participants	Pre	0.084		0.005	49	10	44	54
	Post	0.034			68	12	73	68
Males	Pre	0.09	0.005		49	9	44	54
	Post	0.10			66	13	58	73
Females	Pre	0.48	0.005		49	13	37	61
	Post	0.59			67	12	56	78
NYHA II	Pre	0.34		0.002	52	11	46	59
	Post	0.02			73	9	67	79
NYHA III	Pre	0.21	0.01		45	8	39	51
	Post	0.315			61	13	49	65
40-69	Pre	0.633	0.0005		50	11	42	58
	Post	0.102			71	12	62	80
70-89	Pre	0.144	0.001		48	9	41	54
	Post	0.38			65	12	57	73

Pre & Post Intervention Test for Normality & Paired Samples Data

Self Care Management Behaviour Scores		Shapiro-Wilk Sig.	Paired Samples t-test Sig. (2-tailed)	Wilcoxon Signed Ranks test Asymp. Sig. (2-tailed)	Mean Score	Standard Deviation ±	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit
All	Pre	0.006		0.0005	32	13	26	38
	Post	0.687			53	12	48	59
Males	Pre	0.06	0.005		33	12	26	40
	Post	0.63			56	12	49	63
Females	Pre	0.02		0.026	31	14	18	44
	Post	0.77			49	9	40	57
NYHA II	Pre	0.052	0.005		37	14	28	46
	Post	0.551			59	11	52	66
NYHA III	Pre	0.37	0.005		26	7	21	31
	Post	0.26			46	8	40	52
40-69	Pre	0.174	0.0005		32	14	22	41
	Post	0.685			56	11	48	64
70-89	Pre	0.008		0.003	33	12	25	41
	Post	0.886			51	12	43	59

Pre & Post Intervention Test for Normality & Paired Samples Data

Self Care Confidence Behaviour Scores		Shapiro-Wilk Sig.	Paired Samples t-test Sig. (2-tailed)	Wilcoxon Signed Ranks test Asymp. Sig. (2-tailed)	Mean Score	Standard Deviation ±	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit
All	Pre	0.94	0.0005		38	21	29	48
	Post	0.101			62	24	51	72
Males	Pre	0.59	0.005		44	22	31	56
	Post	0.14			67	24	53	81
Females	Pre	0.15	0.006		28	17	12	44
	Post	0.13			50	19	32	68
NYHA II	Pre	0.51		0.002	50	20	38	63
	Post	0.03			73	22	59	87
NYHA III	Pre	0.008		0.007	23	10	15	31
	Post	0.08			46	6	34	59
40-69	Pre	0.794		0.005	48	21	33	63
	Post	0.046			71	24	54	88
70-89	Pre	0.027		0.003	30	18	18	42
	Post	0.718			53	20	39	66

Between Groups LWP programme score difference test data

Male vs. Female

	Shapiro-Wilk	Levene's test of Equality of Variances	Independent t test Sig. (2-tailed)	Mann-Whitney U test Asymp Sig. (2-tailed)	Mean Score Difference	Standard Deviation ±	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit
MLHFQ								
Male	0.245	0.281	0.666		6	4	4	8
Female	0.982				6	2	4	8
PKQ								
Male	0.96			0.483	4	1	3	4
Female	0.016				4	1	3	5
SCHFi Main								
Male	0.174			0.313	17	11	10	23
Female	0.031				23	13	12	35
SCHFi Man								
Male	0.364	0.871	0.251		23	9	18	28
Female	0.055				18	9	9	26
SCHFi Con								
Male	0.212	0.214	0.809		24	9	18	29
Female	0.723				22	14	9	36

NYHA Class II vs. Class III

	Shapiro-Wilk	Levene's test of Equality of Variances	Independent t test Sig. (2-tailed)	Mann-Whitney U test Asymp Sig. (2-tailed)	Mean Score Difference	Standard Deviation ±	95% Confidence Interval Lower Limit	Upper Limit
MLHFQ								
II	0.373	0.096	0.891		6	4	4	9
III	0.1				6	2	4	7
PKQ								
II	0.006			0.103	4	1	4	5
III	0.364				3	1	3	4
SCHFi Main								
II	0.404			0.187	21	10	15	27
III	0.04				16	15	5	27
SCHFi Man								
II	0.341	0.463	0.62		22	10	16	29
III	0.714				20	8	14	26
SCHFi Con								
II	0.362	0.887	0.884		23	11	16	30
III	0.473				23	11	15	32

Age Groups

	Shapiro-Wilk	Levene's test of Equality of Variances	Independent t test Sig. (2-tailed)	Mann Whitney U test Asymp Sig. (2-tailed)	Mean Score Difference	Standard Deviation ±	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit
MLHFQ								
40-69	0.434				7	4	4	9
		0.129	0.411					
70-89	0.224				5	2	4	7
PKQ								
40-69	0.004				4	1	3	4
				0.971				
70-89	0.097				4	1	3	4
SCHFi Main								
40-69	0.291				20	10	13	28
		0.713	0.609					
70-89	0.98				18	13	9	27
SCHFi Man								
40-69	0.092				25	11	17	32
		0.298	0.119					
70-89	0.126				18	6	14	23
SCHFi Con								
40-69	0.792				23	10	16	31
		0.511	0.92					
70-89	0.481				23	12	13	31